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The Sixth Annual Meeting of the Mysore Agricultural and Experimental Union.

Welcome Speech

BY

H. Srinivasa Rao, Esq.,

Vice-President, the Mysore Agricultural and Experimental Union.

DEWAN SAHEB, DR. COLEMAN AND GENTLEMEN,

It is my pleasant duty this day on behalf of the Mysore Agricultural and Experimental Union to extend a most warm welcome to you all to its Sixth Annual Meeting to conduct which we are assembled here. Coming as the members do from different parts of the Province and with personal experiences of the unfavourable seasonal conditions in their localities, I hope they will be able to help the Association with their valuable suggestions in order to overcome the food and fodder difficulties which have become all important at present. The current year has been marked by extremes of rainfall. The *Malnads* suffered from unusually heavy rains, while the *Maidan* districts have recorded very irregular falls and large deficits. Agricultural crops and even stored up produce were damaged in the *Malnads* to a considerable extent while the crops succumbed to drought, generally, all over the *Maidan* tracts. Over greater portions of the

Maidan districts no tank-filling rains fell for nearly two years and this is the cause of scarcity of water everywhere. The question of water-supply is therefore of the utmost importance, and if this question is solved, food and fodder questions solve themselves.

Irrigation Water.—Food Supply.—In seasons of deficient rainfall tanks fail, and the only source of water that could be relied upon is the underground supply. In the tank districts of Bangalore, Tumkur and Kolar, owing to constant percolation of water from numerous tank beds into the underground layers, the water table is high and this water could be made available by sinking deep wells. But from my personal experience I have found well construction to be a very difficult and technical work impossible of easy accomplishment by ordinary agriculturists. Constructing wells, especially deep wells, is impossible in most localities without efficient labour, pumping arrangements and materials to keep the sides from falling. The majority of our ryots being unable to command these appliances do not attempt well construction or construct only shallow wells with manual labour and such wells fail in bad years. Takavi advances for well sinking do not fulfil the object in the majority of cases as experience has shown. There are several reasons for this and they need not be detailed here. For these reasons the only solution is to give wells to the ryots instead of takavi in cash. I have given full details about this subject when I moved this proposition in the Economic Conference of 1916, when a resolution was unanimously passed in favour of it. The scheme does not involve any additional expenditure or trouble to Government except that of making the usual takavi advances! The existing staff of the P. W. D. and Sanitary Officers in the Districts may have some additional work. If lift-irrigation is extended, people can raise short period crops of food and fodder in bad years. Irrigation wells will thus be a sort of insurance against famine conditions. Government may start work on these lines or make the Engineering, Co-operative and Industries Departments to organize it in joint consultation. The ideal would be to provide each cultivating family with a well, large families owning two or more.

Fodder Supply.—In seasons of deficient rainfall cattle mortality rises high owing to scarcity of fodder. Unfortunately for us fodder famines are not few or far between in the Maidan districts of the

Province. Cattle preservation being very important, fodder resources have to be improved. Supplying harvested fodder from forests is not practicable and the ordinary ryot is unable to pay for it especially in adverse seasons like the present one. A few suggestions in the matter would not be out of place here.

(1) All extra Amritmahal kavals recently made over to the Revenue Department may be kept as fodder reserves under the management of the Forest Department excluding portions which may be given over for cultivation. Preservation of deciduous scrub jungle in fodder reserves is necessary as it improves the soil and helps the growth and preservation of grass.

(2) In tracts where no kavals exist, in addition to throwing open the existing forest reserves for grazing (as is being done) a number of village forests and fodder reserves have to be created.

(3) As grass fodder would not be available in large quantities in adverse seasons, people may be encouraged to raise fodder yielding trees of the *Ficus* family, Acacias and Neem trees, etc., in the gomal lands, the right of fodder lopping and pod collecting being given to the planters. The Peepul tree (*Ficus religiosa*) and some other kinds afford nutritious fodder and cattle feeding on them do not fall in condition.

(4) There is a large stock of fodder in the prickly pear which is abundant in many places but the thorns in the shrub prohibit its use. If gasolene torches are made available as in the State of Texas, etc., (in the United States) this fodder could be freely utilized. In Texas the thorns are quickly burnt off by subjecting the shrub to the flame of the gasolene torch and cattle follow the man who goes out with the torch eager to feed on the burnt shrubs. The fleshy leaves are slightly saltish and cattle like to feed on them. In the absence of the above torch the shrubs may be burnt with rubbish though this is a slow process.

(5) If waste lands are protected from being grazed by goats many trees and shrubs will spontaneously grow up which would give leaf fodder and pods to cattle in bad seasons, but as it is, a few owners of goats profit themselves at the cost of much tree growth which would otherwise come up and be of immense benefit to people and Government as well.

These suggestions combined with encouragement for well sinking may partly solve the fodder question as fodder crops may be raised under irrigation—but our misfortune is that we entirely forget all about such organizations and feel relieved of all trouble as soon as we have passed the adverse seasons. We again think of such things only when we are in the midst of adversities a second time.

I wish particularly to draw your attention to the often-occurring famines and our inability to foresee them in spite of all modern scientific achievements. Meteorology has not helped us much. Meteorological observations are correct records of the past weather conditions, and have not been of much help in forecasting the future conditions. Failing to derive any benefit from these observations I would suggest that the Meteorological Department may, as a matter of research, examine the methods of foretelling the future weather conditions as mentioned in the ancient Hindu Astronomical Works, such as the great Astronomical Work known as 'Siddhanta Siromani of Bhaskaracharya', and many other Siddhanta works. These may be scrutinized for the purpose and a collection made of all statements found in different works regarding rainfall.

Gentlemen, before concluding this, I beg on behalf of the members of the Union to tender our heartiest thanks to the Dewan Saheb, who, amidst the heavy and multifarious duties of the State, has kindly consented to open this Conference which is proof substantial of the keen interest he takes in the agricultural affairs of the country. On behalf of the members I also offer our heartiest greetings to Dr. and Mrs. Coleman who after a long and tiresome voyage have come to us in good health which is a source of pleasure to us all.

Sixth Annual Report.

* PART I

BY

N. Venkatsubbaya,

Secretary, the Mysore Agricultural and Experimental Union.

I have much pleasure in submitting for your consideration the Sixth Annual Report of the Mysore Agricultural and Experimental Union.

2. For the benefit of those who have joined the Union since the last annual meeting and of those in the audience who may desire to join our ranks hereafter, I shall, with your permission, very briefly state the history and work of the Union during the past years.

3. The Union is the result of a generally felt need of an organization which would bind together the men trained in our Agricultural School, the experienced agriculturists of the State and the staff of the Agricultural Department. It was started early in 1918, and secured Government recognition also in the same year. The objects in general terms, as stated in the constitution and rules, are :—

(*a*) To create and foster a feeling of unity of interest among the members.

(*b*) To exchange ideas, to improve the stock of scientific knowledge and to further the development of Agriculture in the Mysore State.

4. The membership of the Union is kept open to such persons as have received training in some recognized agricultural institution, to the members of the staff of the Mysore Agricultural Department and to such others as are approved by the Committee of the Union.

5. The objects being so general and comprehensive it was possible to formulate a very large programme including almost all questions relating to the improvement of agriculture. But it was recognized at the very beginning that, should the Union have any elements of permanency, a definite programme of experimental work which every member would ordinarily be able to carry out, should be drawn

* Part II of the Report will be printed separately and supplied only to the members of the Union. (Secy.)

up. As experimental work was therefore to occupy the chief place in the Union's programme a word or two by way of explanation may be necessary in justification of such a programme.

6. There are certain natural limitations to the work of a Government department. The Agricultural Department depends for its demonstration work mainly on the results of carefully conducted experiments on its Experimental Farms. But agricultural conditions, both soil and climatic, are so varied that what may be an improvement on an experimental farm may or may not be an improvement under conditions different from those obtaining on that Farm. So that the results of the Experimental Farm require to be carefully checked and tested under as many soil and climatic variations as are to be found in the State. There might, of course, be an experimental farm in a place fairly representative of a large tract of country. Yet, that farm would not represent in any accurate way the condition of individual places within the tract, which means that there should be sub-divisions in the tract, and each sub-division should be served by an experimental farm. The argument carried to its logical conclusion would mean that there should be experimental plots on each farm, for the conditions in no two farms are exactly identical. That is to say, that every farmer in however small a degree must be an experimenter, solving the simple problems of his farm which can be solved only on his farm, for himself, the more difficult and complicated general problems being referred to the Agricultural Department. Even the establishment of the largest number of experimental farms that a State is capable of does not solve the problems of individual farms. So, experimental plots cannot be avoided on any farm worth the name. Every good farmer must have his experimental plots in spite of the risk and expense involved. He need not be a scientist knowing the details of experimental methods—the Agricultural Department gives him instructions in as simple and understandable a way as possible of how an experimental plot should be laid out; he does not take big risks because his experiments are on an exceedingly small scale and the losses are minimized because he is not experimenting with fundamentals but is only testing to what extent an improvement recommended to him as the result of accurate tests carried on for years by an agricultural department which has nothing but his advancement at heart, is an improvement. The results of

the tests are important as much to the experimenter as they are to the Agricultural Department. The experimenter finds out the best seed or method for his farm while the Agricultural Department has an indication from these tests of what improvements are to be recommended for the locality. Thus it was that a system of co-operative experiments was considered as one of the most important functions of the Union and a programme of experimental work was accordingly formulated at its first Annual Meeting which was held in May 1918.

7. In the first year the experiments were confined entirely to comparative trials of varieties of ragi from the Hebbal Farm. More crops were added the next year. In 1920, comparative trials of a new plough designed by the Agricultural Department were undertaken by members in addition to the trials of varieties of farm crops. Manurial tests were included in the next year's programme and field trials were conducted with ammonium sulphate as manure for sugarcane. During the present year there has been a greater variety of experiments than in previous years.

8. It was soon found however, that everything was not over by formulating a programme. At the end of the year 1918 the Union had on its rolls so few as 16 members. Members would not crowd in simply because an association was started on what we considered sound lines. To attract more members, at least in the beginning, a more visible symbol of the existence of the Union was found necessary. Further more, men had to be trained to accept this innovation. Early in 1918, therefore, it was decided to publish a quarterly journal in English commencing from 1919. With the publication of the journal in English, membership increased more rapidly. Members began to take greater interest in the experimental work. The Annual Meeting of November 1919 decided that the Journal should have a Kannada edition as well in addition to the English one. This decision was given effect to in 1920 and the first Kannada number appeared in June 1920. With the publication of the Journal in two languages membership increased more rapidly. The volume and variety of the work done by members also increased.

9. Since the Union was started a meeting is being held each year for the discussion of the results of experiments conducted by members and of other questions which are brought up. The

following are a few of the subjects discussed at the previous annual meetings :—

i. A draft scheme for the formation of a Colony of Agriculturists trained in improved agriculture. (This scheme is to be discussed again this year.)

ii. Rural Agricultural Economics—a plea for its study.

iii. An account of Mr. M. Subba Rao's Farm.

iv. Tractor Cultivation in Mysore.

v. Maintenance of Farm Accounts. (This is now an item of the Union's work.)

vi. Well-irrigation in Mysore.

vii. General improvement of Gomal lands.

viii. The sale of Agricultural Implements, Manures, Seeds, etc., by Co-operative Societies.

10. I shall now pass on to state briefly the work done during the present year. The following table shows the increase in the number of members year by year and the number of field tests undertaken by them :—

Year	No. of members on the roll	No. of tests
1918	16	12
1919	89	30
1920	180	52
1921	255	75
1922	282	91
1923	301	153

11. The largest number of experiments were undertaken during the present year. There was a greater variety of experiments too than in previous years. The present year's programme included the following items of work :—

(1) Experiments with implements.—Trial of the Hebbal plough, (and later on, the Mysore plough manufactured by Messrs. Ransomes in England) in comparison with other improved ploughs chiefly, Kolar Mission plough.

(2) Experiments with seeds.—

i. Selected strains of ragi.

ii. Do. of groundnut.

iii. Selected strains of castor.
iv. Hebbal Seedling Sugarcanes.

(3) Experiments with manures.—

i. Ammonium Sulphate and Nitrolim on sugarcane.
ii. Superphosphate with oil-cake on paddy.

(4) Control of Insect Pests.—

i. Sugarcane Borer.
ii. Pulse Beetles.
iii. Cocoanut Beetle.

(5) Control of plant diseases.—Black Rot of Coffee.

(6) Fodder Conservation.—Sunflower Ensilage.

(7) Sericultural Experiments.—

i. Rearing Silk-worms.
ii. Reeling silk.

(8) Maintenance of Farm Accounts.

12. Unfortunately, however, the seasonal conditions proved to be exceedingly bad and trying. I shall not attempt to give an account of the harrowing details of those conditions. Some members could not sow the seed at all. Others who sowed had their crop washed away by heavy rains or parched up for want of water. A few reports of work are, however, available for discussion during this meeting.

I might just briefly state the results of experimental work conducted by our members. Varieties of seed suitable to particular localities have been found as the result of trials. H22 ragi is, as almost every real farmer knows, a very good variety. The results of trials show that a few other varieties of Hebbal selected ragies such as H40, and H43, are even better than H22 in respect of yield. These have given in some places almost 100% more grain on experimental plots than the local varieties. Similar results have been obtained with other crops. Our members have been co-operating since three years with the Department in conducting trials with a plough designed by our Agricultural Engineer with the result that a good plough suitable to red soil conditions in Mysore is now available for sale. Our members are engaged in further testing this new plough with a view to finding out if any alterations are needed before orders are placed for its manufacture on a large scale.

13. As regards the number of members undertaking experimental work, although the *number of experiments* undertaken is fairly

proportional, the *number of members* undertaking work is not so. Out of 203 non-official members only 42 undertook work of some kind or other during the year. It is hoped that members who have not come forward to undertake work will begin to take a more active interest in the Union than they have done up to now.

14. The work of the Union is getting more and more organized and it is hoped that reporting of results will be very prompt hereafter. We have now got printed instructions for carrying out most of the experiments recommended. Printed forms of report on which only the blanks need be filled in and questions answered have been prepared and these forms, it is hoped, will make reporting easy.

15. Before I leave the subject I must, however, say that the quantity of experimental work on our programme requires to be very largely increased. Fifteen years ago, there might have been only a very few field tests, if any at all, which could have been recommended with any amount of definiteness to our ryots. The circumstances are entirely different now. The results of scientific tests carried out by the Department of Agriculture are accumulating year after year. There are now 12 improvements recommended by the Department for just one crop—ragi, alone. There are the results of experiments on other crops—ground-nut, castor, sugarcane and cotton, and the results of manurial tests on various crops. The demand for food and fodder is ever on the increase. More food will have to be got out of the land than hitherto. Better seed and better methods of cultivation will be necessary. To find out whether a seed or a method is better than one possesses or practises there is no other way than that of testing it carefully on one's own land. I would therefore appeal to our members who are pioneers in this kind of work to take much keener interest in our programme than heretofore.

16. There are one or two small items of our work of which a passing mention may be made. We imported, as most of our members know, a small number of seeds of what are called "Dwarf Cocoanuts" from the Federated Malay States. These nuts germinated badly but there are now 27 plants growing up, 24 at Gangenahalli 14 miles away from Bangalore and the rest far off in Kadur District. These are expected to come to bearing in five years and the plants grow so dwarf that the nuts can be picked without getting up the tree.

17. On his return from America Dr. K. Kunhi Kannan brought prominently to the notice of the Indian agriculturist a tree called the "Mesquite" which gives pods that are excellent fodder to cattle. The tree resists drought splendidly and is therefore suited very well to places in this State where fodder famine is becoming frequent. Dr. Kunhi Kannan brought some seeds with him when he came back. These were sown here and quite some 300 plants are being grown by our members. There is a very large demand for seed. It has since been found that there are a few trees in the Government garden at Peshawar. Arrangements will have to be made hereafter to secure seeds from there.

Remarks made by

Dr. Leslie C. Coleman, M.A., Ph.D.

President, the Mysore Agricultural and Experimental Union.

Mr. Banerji and Gentlemen,

It is my privilege and very great pleasure to second the welcome extended to you by my friend and co-worker, Mr. Srinivasa Rao. We are come together at the end of another year to review our work of experiment, to discuss problems affecting the prosperity of agriculture in Mysore and to make plans for the future.

In the first place, Sir, I wish to thank you for the recognition Government have given to the value and importance of the work done by this Union for the development of agriculture in the State. I refer to the provision of a seat on the reconstituted Board of Agriculture for a representative of this Union. This recognition is the more gratifying as it has come, Sir, absolutely without any solicitation or representation on our part. Members who were present at our last Annual Meeting will remember that there was a rather heated discussion as to whether the Union should not push for representation in the various public bodies of the State. It was decided by a large majority that no such representation should be sought and the feeling was very strongly emphasized at the meeting that it would be a serious mistake to give even the suspicion of a political tinge to our organization. The Government have now rewarded us for our modesty and sound sense in this matter.

I wish on behalf of the Union, also to request you, Sir, to convey to His Highness the Maharaja of Mysore our grateful thanks for the

signal honour he has conferred upon two of our members. I refer to Messrs. Devangi Ramanna Gowda and Hosamane Gundappa, who were granted public service medals on the occasion of His Highness'. birthday. I have not the time to enumerate all that these gentlemen have done for the cause of agricultural improvement in their neighbourhoods, and wish only to say that they are among our most useful and active members. I am sure that this gracious recognition at the hands of His Highness will stimulate to renewed effort not only these gentlemen but the rest of us who are working along with them for the improvement of our most important industry. We did not need this gracious action to inform us of His Highness' profound interest in the agricultural development of his State. That was well known to us but it is a profound satisfaction to all of us that His Highness by honouring these our fellow members has as it were set his seal of approval on the way in which we are attempting to further that development.

I have now to turn to a less pleasant theme. It would be presumptuous on my part after a short week's return to the State to describe to you the extremely trying times through which Mysore agriculture is at present passing. You know the conditions better than I do. They are conditions such as to try the stoutest heart. They are conditions, which at the same time, are extremely difficult to alleviate. The Agricultural Department under the orders of Government has done something in the way of distributing fodder from temporary depots in the most severely affected areas. These measures were in the nature of things temporary and were intended to help ryots to tide over a period of fodder scarcity till the rains of the north-east monsoon could bring about a fresh growth. Unfortunately, those rains too have almost entirely failed and it is now practically impossible to purchase fodder at any reasonable distance from the most severely affected areas. Even more serious is the fact that water supplies for cattle are in many places almost exhausted so that unless we get rains to replenish supplies or are able greatly to improve our wells, provision of fodder would be of comparatively little use. We are still hoping against hope that such rains will come but I submit, that it would be criminal on our part to sit down and wait for them.

It is obvious that any relief measures other than supplying what

at the best must be a very insufficient quantity of fodder from distant areas must be concentrated on our best stock, and I believe particular attention should be paid to our breeding cows, for upon them depends the replenishment of what seems almost certain to be severely depleted stock when we get through this crisis. A failure to do this would, I believe, set back the work of cattle improvement in the affected areas for a decade at least. Only two methods seem feasible for the safe-guarding of this stock—one is that of special camps where they can be fed under careful supervision. The other would be the organization of a temporary exodus on a fairly large scale to areas in the western part of the State, where fodder supplies are available. This is a matter which the ryots will look after largely themselves but where the distances to be traversed are very great, it might be necessary to establish temporary fodder camps on the way where the cattle could rest and feed.

I am speaking here not as the Director of Agriculture but as the President of this Union ; as a matter of fact I have not yet sufficient data to hand to warrant my putting any scheme before Government. But I propose to seize this opportunity to get the advice and opinion of Union members on the matter. I need not tell you how much I value that opinion nor how much weight it will have upon any report I may submit to Government. In order to get the opinion of members of the Union as fully as possible I have included the question of fodder supply among the subjects for discussion at this meeting and propose that we shall devote a great deal of time to it.

Our present crisis is a temporary one. No doubt the rains will come, fodder will grow, the Mysore ryot with that invincible courage which is one of his main characteristics will meet his losses manfully and will start on the rebuilding of his stock at the earliest opportunity. I fear, however, that with that lack of memory which is also one of his characteristics he will soon relegate his troubles to the background and display as little prudence in the production and conservation of fodder as he has done in the past. It is, I submit, the duty of this Union to see that present conditions do not occur again.

You will perhaps ask me what can we do ? Obviously we cannot control the weather and we are certain to have in the future as severe seasonal conditions as we have had in the past. We must

therefore try to ensure that a more extensive production and a more careful conservation of fodder than now takes place. Our goal should be **one year's reserve fodder supply always in stock.** Some one will in all probability promptly retort 'With the Mysore ryot living so close to the margin of actual want as he does how will it be possible for him to build up any reserve ?' Notwithstanding the undoubtedly poor condition of many of our ryots there are, I am convinced, a very large number who are quite capable of accumulating a store of fodder who do not now do so or who, if they do, sell it off as soon as tempting offers are made.

I would suggest at least four lines of attack on the fodder question all of which I may say have already been discussed either at our annual meeting or in the columns of our Journal. The first of these is the utilization of our gomal lands as real sources of fodder supply and not as mere exercising grounds for our cattle. This was one of the most important subjects discussed at our last annual meeting, when a strong resolution was passed in favour of the abolition of gomal and the apportionment of it among villagers for the definite object of growing fodder. It was also discussed by the Board of Agriculture but the proposition accepted by us was not so favourably received by that body. The main objection to the proposition was that the villagers would not hear of doing away with their precious gomal. Well, gentlemen, all I can say is that I have spent the past fifteen years in battling against prejudice and unreasoning conservatism, and this Union has come into being with the definite object of overcoming prejudice against real agricultural reforms and we are by no means so pessimistic as some of our friends outside seem to be. Our gomal lands can be made to yield at least four times as much food for cattle as they do now and it is our duty to carry on a campaign of education till some definite action is taken to that end.

We have in the second place the possibilities of new fodder crops and the manufacture of ensilage from them and from existing crops as an insurance against fodder famine. As I pointed out last year, one of the great advantages of ensilage in connection with insurance against famine is that it cannot be carted away long distances and sold. It must be fed on the spot. It is gratifying to know that some of our members have been experimenting with ensilage this year and have at the same time been trying the new fodder crop, sunflower,

which our Live-Stock Expert has so successfully grown under most trying seasonal conditions at the Rayankere Dairy Farm.

Thirdly, we have the possibility of the introduction of new fodder trees and the spread of those already to be found in the State. Dr. Kunhi Kannan has interested himself much in this question and has been responsible for the introduction of a new fodder tree, the "Mesquite" which seems to be full of promise. A number of our members will be able to tell us something of the growth of these trees.

The fourth line of attack I would like to mention is one that has to do not alone with fodder production. It lies at the basis of crop production in general. It is improvement in the cultivation of the soil and more particularly the introduction of such methods as will enable our ryots to utilize our rainfall to the best advantage. There is a minimum amount of moisture varying for different crops below which those crops will not grow and come to maturity no matter what we do in the way of cultivation. However, only too frequently in Mysore crops fail not because this minimum has been reached but because the land cannot be got ready in time for the sowing of crops and because the land has not been properly cultivated. What can be done in this connection has been shown by the results obtained on the Hebbal Farm during the past fifteen years where on account of our thorough and early cultivation we have been able to produce average crops on our dry lands even in years when the same crops in the neighbouring villages have been practically failures.

The inefficiency of the country plough is largely responsible for the unsatisfactory state of affairs in this regard. The introduction of improved ploughs has been a main line of work with the Mysore Department of Agriculture for many years. I need not describe to you the difficulties and discouragements we have faced in this work, but I do wish to draw your attention to the fact that now we seem in the right road to success and success on a large scale. We have in our new Mysore plough an implement which, I believe, will more readily meet the needs of the bulk of Mysore ryots than anything that has been produced heretofore. It remains only to reduce the initial cost so as to bring it within the reach of the great bulk of our agricultural population. With our new iron works at Bhadravati with sources of steel to hand, I see no reason why this cannot be done and I propose to devote much attention to this subject during the coming months.

You will note that the subject of the Mysore plough is down for discussion at this meeting. Although our first supply of these ploughs arrived only in July, a number of our members have already tried it so that the discussion of this subject will have an eminently practical basis.

These are but a few of the lines along which progress can be made in the production and conservation of fodder against times of scarcity such as the present. I have little doubt that our members will be able to suggest many other directions along which useful work may be done which are quite important as the ones I have mentioned.

I look forward to a very profitable discussion upon this subject not only because we shall, I trust, come to some quite definite conclusions but also because we shall be in a position to put many, if not all, of these conclusions into effect on a small scale. It is the unique feature of this Union that it is in a position to do something more than talk about Agricultural improvements. It does not confine itself to passing pious resolutions. Its members are in their own areas carrying many of the recommendations made by the Union into effect on their own lands and are persuading their neighbours to do likewise. There remains much to be done in this direction. We have still far too many inactive members but their number is decreasing and I hope to see the day when every one of us is engaged in some useful experimental and propaganda work aiming at the development of Mysore Agriculture.

There are many other matters upon which I should like to have touched but I must stop. I wish on behalf of the Union to thank you, Sir, for honouring us to-day. You are a very busy man and we appreciate exceedingly your kindness in coming here to open our meeting. I wish also to thank the large number of non-members who are here. We appreciate very much your presence and shall be most happy if you will take part in the discussions which are to follow. As no doubt, you are aware, one of the big events of this meeting will be the Field Day which is to be held at Hebbal on Sunday. I want particularly to extend an invitation to you for that event.

The subjects we have to discuss are many and important. May our discussions lead to some definite steps forward on the road to the development of Mysore Agriculture!

Address at the Sixth Annual Meeting of the Mysore Agricultural and Experimental Union.

BY

Rajamantradhurina A. R. Banerji, M.A., I.C.S., C.S.I., C.I.E.

Dewan of Mysore.

DR. COLEMAN AND GENTLEMEN,

I am very pleased indeed to have this opportunity of associating myself with the annual gathering of the Mysore Agricultural and Experimental Union which has been doing during the past six years much useful work for the general improvement of agriculture in the State. I congratulate the Union on the excellent report of the last year's work read by the Secretary. This is not the occasion to indulge in any platitudes regarding the importance of agriculture in Mysore, or for that matter, in the whole of India, where the bulk of the population depends upon agriculture as their only means of livelihood and where the conservative habits of the ryots as well as deep-rooted convictions and opinions based on the experience of the past prevent them from accepting without definite proof, changes in the agricultural methods and practices. The Mysore Department of Agriculture has familiarized the ryot with the pressing problems of agriculture. Enough has been written and said during the past several years on the subject, not to speak of the discussions that have taken place in the Board of Agriculture under the Mysore Economic Conference. We are shortly to have in Bangalore next month, a meeting of the Board of Agriculture in India where all important questions relating to the development of agriculture in the country will no doubt be discussed. Leaving, therefore, all general topics, about which very little remains to be said, I would like to proceed at once to the most urgent questions affecting the agriculture of the State which are now causing considerable anxiety both to Government and the people. They have been referred to by Dr. Coleman in the speech which he has just delivered and I take this opportunity of explaining to the members of this organization and through them to the agriculturists at large, the policy the Government propose to adopt in the present crisis. At the outset, I wish to convey the deepest sympathy of His Highness' Government with those who are labouring under difficulties owing to the distress that has been caused in certain parts

of the Tumkur, Kolar and Bangalore Districts on account of the partial failure of the south-west monsoon and the total failure of the north-east monsoon. The various measures that have been undertaken by Government to meet the situation have already been announced in the public orders issued in the Mysore Gazette, and they are now in operation. They include amongst others, the liberal grant of loans, starting of relief works, specially tank maintenance, village improvement and wells, grant of gratuitous relief, supply of fodder for cattle. Most of them are based on past experience and the recommendations of local officers, but it remains yet to be seen, according to the seasonal conditions that may prevail in the next few months, to what extent relief measures have to be further enlarged and whether the funds already provided will be sufficient to meet the requirements of the people. We are no doubt passing through anxious times, and the difficulties regarding the water-supply for cattle and also fodder appear, at least in some parts of the State, to be insurmountable. Government will, however, give unremitting attention to these matters and consider the suggestions that may be put forward by the Agricultural Department in regard to them : and I hope the Union will now discuss the situation and favour the Department with their well considered opinion. It is necessary to find new sources of water supply and increase the supply of fodder by whatever means possible, and, at the present moment, besides opening special camps as suggested by Dr. Coleman for feeding cattle and marching them to the western parts of the State and releasing the State Forests for grazing purposes, an earnest endeavour has to be made to get additional supply by the cultivation of fodder under channels and tank-beds, and improvement of gomal lands in regard to which proposals are already under the consideration of Government : and if the Department of Agriculture will help in the matter of supplying the necessary facilities for this purpose, I am sure the Government will not hesitate to sanction them funds besides affording inducements and concessions. In regard to water supply, the difficulties pointed out by the Vice-President of the Union are well known in the Mysore State so far as the digging of wells is concerned. Various suggestions are now under the consideration of Government and it will be helpful if you deliberate on the point also and place your suggestions before the Agricultural Department. I am prepared to consider

any scheme for the construction of wells on a large scale to tide over the present difficulties which, I am sorry to say, are more or less of a recurring nature in the Mysore State where every year, to quote Sir Seshadri Iyer's famous minute of 1884 "is one of anxiety both for the Government and the cultivator." Irrigation wells have proved to be a valuable asset to the ryot in bad years and I think this is a fitting opportunity to go into that question with a view to see how far the conditions of Mysore lend themselves to the construction of such wells on a large scale in certain selected tracts and how far mechanical contrivances may also be provided to the ryots under the takavi system for lift irrigation. Both in regard to this question as well as the question of ensuring one year's reserve supply of fodder, I shall eagerly await the definite recommendations of Dr. Coleman, which, I am sure, will help Government in arriving at some practical solution of our present difficulties.

I fear it has to be admitted that Mysore agriculture is now passing through a period of depression. Although the prices of food-grains are fairly high, it is not altogether certain that the producers benefit substantially by the rise of prices. There are, besides, other circumstances which appear to militate against large profits so far as the agriculturists as a class are concerned. In my Dasara Address of 1922, I discussed at some length the whole question of food production in the State giving all the available statistics and came to the conclusion that it was necessary to have an economic survey with a view to ascertain the exact position of the agricultural population in the country and the agricultural stock in order mainly to determine the question as to whether they are sufficient for any large scheme of the expansion of cultivation. I see that one of the papers to be read to-day at this meeting relates to the Colonization scheme. I have indicated in my previous Addresses on several occasions the need for a large extension of cultivation in the State and the grant of land on a liberal scale to the landless classes. Considerable progress has been made by the efforts of Government in these directions during the past year and a half; a very large extent of Amrutmahal kaval lands has been allotted for cultivation both under the auction system as well as under the system of special grants to the landless and the depressed classes. Considerable progress has been made in the disposal of pending darkhasts and this policy is being pursued with vigour

by the Land Revenue Department. There is yet much to be done in these directions and unless there is an appreciable increase in the area cultivated under food crops which at present does not yield sufficient food for the people and special efforts are made for improvement of the food stock to tide over bad years and years of insufficient monsoon, there will be a recurrence of distress which will gradually undermine the staying power of the agriculturists as a whole. Mysore agriculture has its own special problems and no one is more conversant with them than Dr. Coleman, through whose valuable guidance the Agricultural Department has been able, during the past 6 or 7 years, to do so much for the ryot population. The deterioration of the soil, the difficulty of obtaining manure and labour, the shortage of water for irrigation under tanks, are all problems of special character that require special investigation and special remedies. The Departmental activities have been largely concentrated on introduction of improved methods and implements, demonstration and experiment, but a good deal of co-ordination is necessary, as suggested by your Vice-President, between the Departments of Agriculture, Irrigation, Industries and Commerce, to set up an elaborate scheme for the remedy of those essential drawbacks and difficulties which the agriculturists of Mysore now labour under.

I am glad to see the excellent work that the Mysore Agricultural and Experimental Union has been doing—an organization which is mostly in the hands of genuine and *bona-fide* agriculturists of the State, assisted by the officers of the Agricultural Department. It is undoubtedly to the advantage of Mysore agriculture that any propaganda work or work relating to definite improvements based on experiments made under various agricultural conditions should be performed by those who are directly connected with the land and it is by their efforts only that the work of the Agricultural Department can be proved to the hilt for ready acceptance by the ryots. It is not possible for Government to make these experiments on a large scale by the establishment of experimental farms in each taluk. The lessons learnt at the Government Demonstration Farms can be picked up by Experimental Unions such as the one you have formed, and in the long run it would be more economical to Government to introduce a system of Government subsidies and grants for Experimental Stations set up by agriculturists in the different parts of the

State, on the co-operative basis rather than open Government Farms as is sometimes urged by the members of the Representative Assembly. I therefore suggest that you may go into the question of having more than one Agricultural and Experimental Union organizing, say, to begin with, one for each District, enlisting the co-operation of leading agriculturists of the district, to make experiments in their own holdings in respect of main food crops as well as the industrial crops under the guidance of the Agricultural Department on a co-operative basis, if necessary ; and if such organizations are set up, I shall earnestly consider the question of giving substantial financial help to such organizations to give them additional inducements and encouragement. I should think it may be possible to consider in the same connection the question of agricultural finance and indebtedness, the disbursement of loans for land improvement, irrigation wells, etc. These Unions might very well undertake the work of investigation and recommendation to Government for the grant of such loans. They may also undertake the management of co-operative agricultural societies for the distribution of seed, implements, etc., and in course of time, these organizations may be set up in each taluk, and they may gradually take over all such work, especially rendering unnecessary the employment of a large staff of Government officials in the Agricultural Department.

I am glad that the Mysore Agricultural and Experimental Union appreciate the representation which has been granted to it in the revised constitution of the Economic Conference, and I earnestly hope that this Union will, by its practical knowledge of agricultural situation in the State, be able, through its representative, to help the Board of Agriculture in Mysore, in solving some of the pressing problems which I have vaguely indicated in the course of this address. The anxiety that His Highness' Government feel for the improvement of agriculture in Mysore needs no emphasis and if there is any other way in which the Government can afford additional encouragement or relief than those they have already enunciated and are adopting at present, I shall be only too glad to consider the same if you will kindly submit your recommendations through Dr. Coleman after careful consideration.

Gentlemen, you have got a varied and interesting programme to go through and some of the items in your agenda have a direct

bearing on the present acute situation. I wish your deliberations all success and hope that you will be able to arrive at practical solutions in respect of all the important questions that directly affect the future prosperity of Mysore agriculture.

Before concluding, I would, on your behalf and on behalf of Government, extend a hearty welcome to Dr. Coleman back to his work as head of the Mysore Agricultural Department. His presence at the present juncture will, I am sure, be a source of strength to Government in dealing with the unfortunate situation that has now arisen.

With these words, Gentlemen, I have much pleasure in opening the Sixth Annual Meeting of the Mysore Agricultural and Experimental Union.

The Fodder Situation in the Mysore State.*

BY

W. Davison, B.S.A.

Live-Stock Expert in Mysore.

I have been asked to lead a discussion on the question of Fodder Supply. Always a question of some difficulty, it has this year reached a pitch which is of the greatest gravity, and it behoves this Union as representative of the best of the agricultural community, to make a start to lay down a permanent policy which will prevent the occurrence in the future of a similar situation to the present, and to go on with it. It is said that the way to hell is paved with good intentions. There is some satisfaction to be gathered from that, as, if there is only one road, it must be a long one, unless the way is broader than it is long. Let us not, however, contribute to the construction of that highway, but rather make an additional resolution, that we will carry out a better policy than in the past, year by year, in seasons of plenty as well as of scarcity, and to stand prepared against the fickleness of the seasons which is common experience and which in itself we are unable to change.

I propose to handle this subject in two phases, *viz.*, that of a permanent policy for the future, and secondly, with regard to the

* Speech with which the discussion on the subject was opened at the Annual Meeting on 13th December, 1923.

present acute situation and what means can be adopted to alleviate it and shall treat of the permanent policy first. No one is more ready to realize the fact that we can all learn from each other than I do and it is my hope that in the discussion which will follow, some new ideas will be put forward. Let us examine the fodder situation as it normally exists. There are numerous weak places in it all of which have led up to the present crisis. They may be enumerated as follows :—

(1) *The endeavour to keep too many cattle.*—This is due to the wish for as much manure as possible, and is also due to the desire to get as much or more from the gomal as others in the village. Here, one of the evils of the gomal system is emphasized, which will never be corrected until the gomal as such, is itself abolished. The fact that a large number of the cattle so maintained are of absolutely no economic use except as manure producers is to a large extent the result of the foregoing.

(2) In most cases *a complete dependence upon gomal lands for the maintenance of cattle, and the community control of such gomal.*—Dr. Coleman has already mentioned the discussion held by this Union on this subject at a previous meeting, and I think my views on the gomal system which I put forward then do not need reiteration. I may say, however, that I am more firmly convinced of the soundness of my views now, than I was then. I have recently received some interesting proof of what can be done in increasing the efficiency of this kind of land by proper handling in connection with some Amrit Mahal Kavals which have been rented out for grazing. In nearly all cases, (in imitation I may say of the system which is carried on by the Amrit Mahal Department itself) by dividing the land into sections and grazing alternately, the capacity of each portion has been materially increased and the grass allowed to maintain a proper growth before it is grazed off. But most of our gomal land is capable of producing much more in the way of fodder if it were to be cultivated with fodder crops, or even for food grains. It would be pleasant if we had land which was for ever growing luxuriant grass without any labour being expended on it. But, Gentlemen, I will guarantee that if such were the case, under communal management, the present evil of over-stocking and improper management would continue, and the ultimate result would be the same.

If we trace the development of the cattle industry in, for example, Canada and United States, we will find that it was exactly this tendency to over-stock which led to the demarcation of private areas, and the form of cultivation which now exists in the prairie sections of those countries. I can see no alternative but that Mysore must follow suit in this matter eventually and the sooner she does so the better.

(3) *No effort is made to grow fodder as such, nor to build up a reserve against bad years.*—This is really a criminal neglect. Dr. Coleman has already mentioned this matter, and it is also a matter of common sense which one hesitates to urge for fear of insulting one's audience, and yet the necessity seems to exist. As one who is this year enjoying the result of making a reserve, I am able to speak with a degree of emphasis on this point. I may say that had it not been for my determination to build up a year's reserve supply of fodder on the Rayanakere Dairy Farm, a policy which was put forward from the start of the farm's existence, we would be this year under the necessity of selling off a number of our stock, for we suffered there in common with others from the lack of rain, and in spite of a surprising growth of Sunflower under adverse conditions we did not grow enough crop to meet the year's requirements. However, with the help of our reserve supply we are secure in the knowledge that we can feed our stock, and that the fodder being largely in silos, there is no danger of it catching fire—a feeling of security, Gentlemen, which I can recommend to you as well as the methods of securing it.

In this regard, then, it is highly desirable, and indeed necessary to progress, that you should act in the following directions :—

(1) Maintain only what stock can be properly cared for, and have them of a useful kind. Manure cannot be made of wind, and herd of cattle which get no fodder, and serve no other useful purpose, have no use. In fact they threaten the existence of the better class of stock.

(2) Determine to grow every year a certain area of a purely fodder crop, which will give the maximum yield per acre.

(3) Conserve the available fodder by more careful management and use, by the use of silos and by all other means.

(4) Build up a reserve with the aim of keeping always a year's supply on hand, and to replenish it when famine has necessitated its use.

There are many other things which might be said on this subject but time will not allow of much more from me if I am not to monopolise too much of it. I have also omitted to mention fodder trees which may be better spoken of by others. The storage of fodder as a reserve by Government is now done in Bombay and is worth consideration as a Government measure.

Now to turn to the present distressing situation. The situation as it exists needs no elucidation from me. So much has already been said by our Chairman and Dr. Coleman. Relief measures too must take one of the few possible directions. Either the fodder available in other parts must move to the cattle or the cattle must move to the fodder. Four methods of accomplishing this seem to be all that are available.

1. Cutting forest grass and hauling it to the affected areas, to be sold there.

2. The formation of concentration camps in the affected areas where the best use could be made of the available local plants such as prickly pear, date leaves, etc., supplemented with fodder transported from other areas, and the use of concentrated feed.

3. Marching cattle to Malnad areas where they can remain for grazing and where movement will be made by owners independently.

4. Marching the cattle under supervision, and the organization of *muzil* camps where fodder depots would be established, and fodder supplied to fit the cattle for the next day's march.

Such steps as opening local forests, which were of some use in the early stages are not now of any help, as the growth in these places is not sufficient to improve matters.

1. *Cutting and transporting grass.*—It is unlikely that this can be done in sufficient quantities to cope with the situation to anything like what is desirable. Moreover there are many factors entering into this arrangement which complicate the operation and increase the risk of delay, irregularity, etc., and add to the cost. Those who are content to wait for and depend on such a supply are likely to be

considerably disappointed. I believe that the Forest Department is capable of doing this work better than any other organization in the State, and will do this to their utmost ability. But I am afraid that it is not humanly possible to cope with the situation in this manner and that the demand is far too great to be satisfied by what can be done in this way.

2. *Concentration camps* would help to some extent. These would call for a great deal of co-operation on the part of villagers in the preparation of fodder, and a proper working of the camps. In such camps no doubt a good deal could be done in the way of utilizing such materials as prickly pear, date leaves, etc., and thereby lessening the necessity for transported fodder. It has been found, however, that it is usually necessary for *the Government to buy the cattle* to be encamped for *resale* after conditions become normal and the Bombay Department of Agriculture in their reports on recent famine relief work emphasize the necessity for this, as well as the care that should be exercised in selecting the animals to be so bought. My own view of the matter is that if cattle have to be bought it would be unnecessary expense to make concentration camps, *but that they should be marched to where grazing exists.* Such concentration camps are necessary only from the unwillingness of the people to move their own cattle, or from the fact that distances are insurmountable. In Mysore this is not the case. I saw yesterday close to Lakvalli, a large herd of cattle from Gubbi which had moved there in six days without any loss. The cattle had been there 10 days and were already putting on condition.

3. *Marching cattle to grass areas.*—The difficulties in adopting this procedure seem to be very largely made by the people themselves. Distance and the innutritious nature of the grass of the Malnad are the two objections usually put forward. That the distances can be overcome there can be no doubt. Similar distances are covered by herds of cattle moving from place to place as a regular thing, the only thing required being a properly laid-out route. Over certain tracts it might be necessary for halting camps to be formed. But this I will mention later. As for the grass, I may point out that it is the same Malnad grass which must be supplied in any case, even though the first method I have mentioned be the only one put into

effect. Moreover, chemical analysis, so far as it has been carried out by the Agricultural Department, has failed to show that the grass of the Malnad is of a lower feeding value than that of Maidan parts. I grant you at once that there is some difficulty attached to moving cattle to outlying parts of the Malnad, but I am of the opinion that it is the only solution to the present difficulty which is able to solve the difficulty in a large way. I have just returned from a rather hurried trip in that part, and I can assure you that there are thousands of acres of very excellent grazing waiting either for proper use to be made of them or to be destroyed by fire. Most of these areas are not suitable for cutting as transportation as well as labour difficulties are too great to make that a practicable proposition. These areas are veritable gold mines for the Maidan cattle owners if they would only make use of them. For the next four months the climate of those parts is something to be desired. Even in the heaviest part of the monsoon I understand that a large number of cattle are grazed on the Kudure Mukh with comparatively few losses and those among old animals. The grazing in this area is something that far exceeds in quality and quantity anything which I have ever seen in Maidan parts, and it seems to me nothing but a crying disgrace that the owners of cattle prefer to sit and watch their animals starve slowly to death, or call on the Government for assistance, when they are well able not only to help themselves but to show the example to others and to at least relieve the Government of this much of the great embarrassment which the adverse season has brought about. As to the extent of the available areas the Conservator of Forests can give you much more detailed information than I am able to do, for there must be many more areas than I have been able to see. However, I have seen enough myself to know that the area is vast and capable of considerable exploitation. In Lakvalli range alone I am informed that there are not less than 15 square miles of grass, which I have seen myself growing waist-high. As I have said, the chief obstacle to this means of relief is the apathy of the people themselves. There may be, however, certain cases in which it may be advisable, if not necessary, to arrange definite routes on which could be made halting camps at suitable distances probably every 15 or 20 miles. In these camps fodder for the night and watering arrangements could be made at nominal rates for fodder. It would even pay Government to supply

fodder free in order to induce movement, but this is of course, a matter for their consideration. In any case it appears to me that it would be better for the people to favour this way of helping themselves than to allow matters to go to such a pass that the Government will be obliged to buy their cattle to keep them from being a total loss to the country and a profitable thing, for there can be no doubt that the man who has cattle to dispose of twelve months from now will be able to command high prices.

I have said nothing about Amrit Mahal Kavals. Some of you may have noticed this. The reason is quite apparent to any thinking man. It is that the Kavals have been as badly affected from the want of rain as any other lands and that the grazing will not be sufficient for the cattle of the Department. In fact I may say that probably no one is as fully aware of the fodder difficulty as I am. for I have been as badly hit by the drought as any one in the State. These, gentlemen, are all the remarks I intend to offer. There are many of you who may have more to say on this subject. and I hope that some of you can come forward with other ideas or can throw a fresh light on those which I have presented.

Spraying against Black Rot of Coffee.

***Report on Experiment**

BY

Mr. T. Narasinga Rao,

Coffee Planter, Chickmagalur.

Coffee is cultivated on a very large scale in Brazil which is the chief coffee producing country in the world. It is also cultivated in Jamaica, Java, Sumatra, South Africa. etc.. the latter being only minor producers. It is also cultivated on an industrial scale in Southern India and forms one of the important industries of Mysore, being cultivated in the Districts of Hassan and Kadur and employing a very large amount of labour both local and imported. In Mysore, it is grown at an elevation ranging from 2700 to 5000 feet above the sea level. The coffee area in the State has an average rainfall of about 100 inches a year, most of it falling in the months of June,

* Report read at the Sixth Annual Meeting on 15—12—1923.

July, August and September. About 1,40,000 acres are under holding, of which a lakh of acres are held by Indians. The other 40,000 acres are held by Europeans. In all, about a lakh of acres are actually under cultivation. Almost the whole crop is exported and finds a ready market on the continent of Europe. The annual income from the industry ranges from 60 lakhs to a crore of rupees, depending on the price of coffee.

The chief diseases the plant is subject to are Borer, Leaf-disease (or *Haemelia vastatrix*), Koleroga or Black-rot. Recently, Green-bug, Stump-rot and Die-back have made their appearance. The actual loss from the various diseases is not less than 50% of the crop.

Black-rot or Coffee Koleroga.—This disease is found to exist in almost all the coffee estates of the Kadur and Hassan Districts, in varying degrees. The disease is very severe, and the heaviest loss is suffered by some of the planters whose estates are situated in the Taluks of Chickmagalur, Mudigere, Koppa and Sakalespur. The disease as will be seen from the places severely affected is closely associated with a heavy rainfall. In the year 1918 when the South-West Monsoon was a total failure, the planters picked about 25 to 50 per cent above their estimates. In Koppa Taluk where the estates are situated on a comparatively low elevation and where the annual average rainfall is about 150 inches, the disease is very severe and the greatest ravages are reported chiefly from this Taluk. In Mudigere Taluk also the estates with a heavy rainfall suffer most. Coming to Chickmagalur Taluk where the estates are situated at different elevations, the leaf-rot is found to be very severe on estates on the western slopes of the Bababudans, the estates on the eastern side suffering comparatively less.

The coffee Koleroga attacks the coffee plants during the rainy season. It begins to show itself about a month after the South-West Monsoon sets in. The disease is very severe in the months of July and August, and a part of September and stops as soon as the monsoon is over. The younger plants in a new clearing are free from the disease for the first six or seven years and as they grow older, the disease begins to appear. First, a leaf here and there begins to turn black and gradually the whole plant turns black and all the leaves get affected. It attacks both the berries on the plant and the wood. The younger wood which is to bear the subsequent crop succumbs

to the disease and the older wood resists the spread of the disease and often survives. On closer examination, we find a filmy cob-web-like layer of mycelium on the under-surface of the leaf. It is present on the whole of the under-surface completely covering all the portion of the leaf, from the leaf stalk to the apex. It can be peeled off easily and we find the mycelium has completely covered the petiole and the tender portion of the wood. The stalks of the berries turn black and also a portion of the berry itself turns completely black and falls off sometimes individually, or in clusters if the disease is very severe.

At present the remedial measures adopted by the planters are that the rotten leaves are picked off, when the disease is spreading. Sometimes the operation is repeated several times during the monsoon months.

The first attempt by the Department to combat the disease was made about 7 or 8 years ago, when Mr. (now Dr.) M. K. Venkata Rao was deputed to conduct spraying experiments on my estate. On account of there being no break in the monsoon though we waited for 2 or 3 days, we were not able to conduct the experiment at all, but we poured the mixture on some of the plants. It was observed that those plants did not suffer so heavily from rot.

Under the auspices of our Union, I undertook last year to conduct spraying experiments. Accordingly the Department was kind enough to spare me the services of Mr. S. V. Venkatarayan, the Junior Mycologist. I think it will not be out of place here to mention something about the situation and the climatic condition of the estate. It is situated on the western slopes of the Bababudans at an elevation of 4,500 feet above the sea level. The average record of rainfall is about 80 inches, most of it falling in the months of June, July, August, and September. The temperature in the monsoon ranges from 60° to 75° F. in shade.

In order that it may be under close observation, we selected, for our experiment, an acre of land adjacent to the estate bungalow. The experimental plot is planted 6 by 6 feet and it contains 1,200 plants to the acre. The plants are about 20 years old and they completely cover the ground, there being no vacancies. The shade trees are Silver-oaks and Nerale * which were also planted at the time of planting coffee. The field had been dug and the plants pruned

* Eugenia jambolana.

in the months of March and April. The plants had put forth very good wood after the pruning and there was little or no crop on the plants on account of the rather heavy pruning. We took 20 rows of coffee of 60 plants each. This was divided into two big blocks of 600 plants each. Each of these was again divided into four blocks of 150 plants. So in all we had eight blocks of 150 plants each. The mixture was prepared as follows :—We took 48 measures of water and dissolved in it 5 lbs. of copper sulphate. In another vessel we dissolved 5 lbs. of lime in 48 measures of water. These two were mixed and tested to see if the copper sulphate was neutralized. To this resin boiled with soda was slowly added. The monsoon had already set in and we had to go on with the spraying slowly. Out of the eight blocks mentioned above, we sprayed every alternate block, the remaining four serving as checks.

To test how the spraying would act on unpruned plants, we sprayed about 50 plants in another portion of the estate. This block had not been pruned for the last 4 or 5 years and was nothing but a mass of wood. I am glad to inform you that the experiment was a complete success, though we had an unprecedented rainfall of about 120 inches. Not a leaf has been affected and the sprayed blocks are looking very healthy, whereas the unsprayed check blocks have lost most of their leaves, and they are at present making wood. In spraying we took particular care to see that the under-surface of all the leaves was sprayed and also the ground round about the plant.

The field we selected was suffering from Black-rot year after year and to speak the truth, I myself was a bit diffident about its success. I am sorry I cannot give you the actual cost of spraying as we did not keep proper accounts this year, but I am told that it may come to Rs. 25 to Rs. 30 an acre. The strength of the mixture may safely be reduced by half. If this is done and the resin-soda adhesive replaced by casein the cost may come to only about Rs. 15 to 18 per acre.

The experimental field has not been picked yet, and as I told you before, it has very little crop. I intend continuing the experiment next monsoon and will be able to place the result of our experiments at the next Annual Meeting. I thank the Department for all the help given to me and Mr. Venkatarayan under whose personal supervision the work was conducted.

I am also glad to bring to the notice of the Department that several Indian planters are convinced of the efficacy of spraying and are willing to take it up on their own estates.

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* The Kolar Sheep Breeders' Association.

Mr. Earegowda,

Landlord and Member, Kolar Taluk Board.

The association owes its origin to me and to a few others in my district who began sheep clipping work under the guidance of the Live-Stock Expert in the early part of 1921. The work developed so much that in May 1922 at the Agricultural Conference held at Kolar presided over by Dr. Coleman, a formal resolution was brought for the formation of a Sheep Breeders' Association in the District for the improvement of sheep husbandry. The subject was discussed in detail at the Conference and it was unanimously resolved to have an association of the kind suggested by Mr. Davison. This association has been working since June 1922, and I am one of the foremost members of the association in taking help from the association. The aims and objects of the association are very good and are within easy achievement by one and all. The subscription also is not much and is as low as one rupee per annum. The benefits derived by being a member of this association are many. The members get loan of cross-bred rams, clipping and dipping are done regularly by the association, now free of cost, but it is likely that clipping and dipping will be charged for in future. Constant visits are paid by the Agricultural and Veterinary Officers to see the condition of our sheep, for helping us in marketing and getting higher prices for our sheep and wool and for other help connected with the improvement of sheep husbandry.

The clipping of sheep with the clipping machine has given entire satisfaction to all sheep owners of my village. It not only gives a clean finish to the sheep but also more wool is clipped with the machine than by the local method. The work is easy and more sheep can be clipped in a given time. As it is, the association is clipping sheep belonging to the members, but when two of my neighbours who are

* Report read at the Sixth Annual Meeting on 15—12—1923.

not members wanted to have the clipping done it could not be done as there were other demands for the machine just then from other members. Being disappointed in this way that season, the gentlemen referred to above have now become members of the association. I also learn that the work done by the machine in the villages of Bethmangala Hobli where large flocks of sheep are kept is much appreciated and that there will be a great demand for clipping work from those places in the coming season. So, gentlemen, the use of the clipping machine for shearing work is becoming very popular. I was under the impression that if sheep were allowed to grow wool on them for a year, they would get bad in condition, and lose wool on account of lice making appearance on them. Now the association has clearly demonstrated that no harm is done to the sheep by allowing the wool to grow for a year and that lice may be kept off by washing the sheep once in six months with a disinfecting solution. This method has been tried in many places by many members and by myself also and I have seen no case of lice making appearance, wool falling off, and the sheep going down in condition. Now almost all the members are getting their flocks (white or black) dipped regularly once in six months. By allowing the wool to grow for a year, we get longer staple wool and get higher price. This is my summary of the work done by the association in organizing sheep clipping and dipping in the district.

In my village, myself and a friend together own forty white ewes purchased through the Kolar Sheep Breeders' Association, and they are all in good condition. I have also received one cross-bred ram from the association and the offspring are very much superior to the local ones. When I brought the ewes and the cross-bred ram to the village, many of my people did not approve of my action and began to mock at me but I patiently pocketed their insult but when I showed the offspring born of the ewes brought by me, they all began to realize the truth of what I was saying to them about the improvement of sheep by the use of better rams, ewes, etc., and three men who had about eight white ewes in their flocks have brought their ewes for being covered by my cross-bred ram. To my misfortune I did not get any ewe (got from the Kolar Sheep Breeders' Association) covered by the pure Merino ram at Hebbal as the ewes supplied to me were all supplied by the President from among those purchased at and round about Bethmangala,

Some of the members of the association got ewes covered by the pure Merino ram at Hebbal. The lambs born of these ewes are exceedingly good, big in size, with wool soft and beautiful in appearance. I was told by the Secretary of our association some months ago that our District Board has arranged to get a Merino ram to Kolar for the use of the members of the association. We are anxiously waiting to send our ewes for being covered by the Merino ram but whenever I ask the Secretary he says the ram will come next month. He told me the same thing a few days ago. I hope his next month comes soon. I have seen the few lambs born of the ewes covered by the pure Merino ram, supplied through the Kolar Sheep Breeders' Association in our district and they are exceedingly good. It is these lambs that have enlisted more members, sympathy and support from the people of the district for the association and not so much the undoubtedly energetic work of the Secretary and his staff.

Gentlemen, I have taken much of your time in narrating to you in detail the benefits derived by the work of the association in our district, and will close my remarks with a few more words. The present secretary, I mean the secretary of the Kolar Sheep Breeders' Association, is not very useful to us, because he has multifarious duties and he seldom comes to us and even if he comes to us, he puts a few questions regarding sheep work and sees the flock from a distance and begins to ask in detail about sugarcane, ragi, manure, ploughs, etc., and spends more time for that kind of work and in talking and inspecting crops. We want a Secretary who will come to us as frequently as possible and talk to us about only one matter at a time as our brains are not so highly cultured as to grasp many things at a time. I wish also to state that some better arrangements should be made for the supply of ewes and rams to the members. I also remember to have been asked by the Live-Stock Expert some time back to change rams from the flocks and for this some arrangement should be made. I would suggest that all rams supplied by the association to the members be got back in a certain month when all breeding work in the flocks is over and kept at Kolar, well looked after and distributed to the members with rams exchanged, just before the breeding season commences.

Our association has 74 members on its rolls, has supplied 300 white ewes and 18 rams to the members up till now and has clipped 4,000 sheep since July 1922. This shows the good work done by the

members—pardon me, Sirs—by the Secretary and his staff. A Sheep Show was also held in May, 1923 and one hundred sheep were put on the show and medals, prizes and certificates were awarded for the best ones recommended by the Show Committee consisting of the Live-Stock Expert, the Divisional Veterinary Inspector, the President of the Kolar District Board, with two other non-official gentlemen. And I hope that if similar associations are formed in other districts also, the improvement of sheep husbandry in our State will develop rapidly.

Gentlemen, so much about the improvement of the sheep husbandry in the district and I conclude my remarks by requesting the Live-Stock Expert to arrange to form an association on the above lines for the improvement of *cattle* in the district. This association will help the Live-Stock Expert a great deal in the improvement of the cattle in the district as is now being done by the Kolar Sheep Breeders' Association regarding sheep. If, however, the formation of a separate association for cattle work is found to be not necessary at present, I request that this item also may be tackled on to this association as a trial for some time with a view to supplying good bulls and heifers (one-year old calves) from the Amrit Mahal Department to the members of this association at upset prices and arranging to hold periodical auction sales of calves, cows, etc., in our district in selected localities. This kind of help to the people will be very much valued and the work of the Live-Stock Expert will develop at a very rapid rate.

Gentlemen, I thank you all for the kind hearing you have given me, and I will be failing in my duty if I do not thank our President, Mr. Davison, for the great help he has rendered to us in doing all this work.

Sericultural Experiments at the Channapatna Central Silk Farm.*

BY

Mr. H. S. Govinda Rao, B.A.

The race of Silk-worm that is being reared in the Sericultural areas of Mysore State has got certain good qualities. The worms are strong, resist disease, and are multivoltine. But the quantity of silk produced by these is very little, the number of days taken from hatching to finish is more and the worms are not very active. The foreign races, that is, Chinese, Japanese and European, are rich in silk, take a shorter time from hatching to finish and are very active. But unfortunately, these worms are weaker, are less resistant to disease and generally produce only one generation in the year and the eggs require to be put in cold storage for at least 70 days before they hatch uniformly. We have been trying to combine the good qualities of both the Mysore and the foreign races. The following are the results of the rearing of the foreign races and their crosses with Mysore at Channapatna. We have in Mysore seven pure Chinese, three pure Japanese, and one pure European race,—all these races having been obtained from the "Imperial Experimental Station", Tokyo, and the Nanking University at Nanking, China. The above races and their crosses with Mysore are being reared in Channapatna since May 1923. I find that it is very difficult to rear the pure Chinese races, while their F1 with Mysore are almost as easy to rear as the Mysore worms. It is less difficult to rear the pure Japanese but their F1 with Mysore are more difficult to rear and produce sometimes not quite uniform results. The pure European and its F1 with Mysore are rather difficult to rear.

The following statement shows at a glance in what points the Mysore × Foreign are superior to the Mysore race :—

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* Summary of Speech at the Sixth Annual Meeting.

Race	No. of days taken from hatching to finish	Percentage of silk content to development of cocoon	Average length of filament from each cocoon
Pure Mysore ..	About 30 days	12 per cent	494.4 Yds.
,, Japanese ...	,, 26 ,,	15 to 16 per cent	650 Yds.
,, Chinese ..	,, 24 ,,	14 to 15 per cent	600 Yds.
Mysore Fixed White..	,, 27 ,,	14 per cent	500 Yds.
Mysore × Japanese F1	,, 26 ,,	14 per cent	600 Yds.
Mysore × Chinese F1	,, 24 ,,	14 per cent	550 Yds.
Mysore × Fixed White F1	,, 26 ,,	13 per cent	500 Yds.
Pure European ..	,, 26 ,,	15 per cent	700 Yds.

We can understand from the above that Mysore × Foreign F1 worms take less time from hatching to finish. The interesting point to note is that the worms commence to form cocoons 6 or 7 days after the 4th moult. This is the most voraciously eating period. The Mysore worms commence to form cocoons only after the 9th day after the 4th moult.

Besides, the quantity of silk produced and the length of the filament from each cocoon of the F1 is more than that of the Mysore race.

The Union members are requested to co-operate with the Department in carrying out Field Experiments with F1 race.

Experiments in Rearing Silk-worms for Seed.

Rearing Silk-worms for seed is a special work to be done by specially selected rearers who have much experience in rearing work and possess a certain amount of intelligence. It is not safe to depend only upon the examination of moths with the microscope. Examination of moths is only one of the ways of securing disease-free layings. With a view to devise methods for preparing satisfactory disease-free layings some experiments were conducted at Channapatna. The progeny of each moth were reared in a batch from hatching to finish and the worms were also mounted separately. Steps were taken to prevent contaminative infection as much as possible. A few worms of each-age of each batch were examined microscopically and if found

pebrinised the worms of that particular batch were rejected for seed. After the formation of cocoons some pupa from each lot were examined and if found pebrinised they were not used for seed. When 3,383 moths from such cocoons were examined only six moths were found pebrinised. Whereas two lots of moths from purchased cocoons showed the following results :—

	Number of moths examined.	Moths found pebrinised.
Lot 1.	2,625	444
Lot 2.	2,022	1,022

The advantages of this system of rearing are obvious. But the ordinary rearer cannot be expected to rear the progeny of each moth separately. But if he rears the progeny of about 100 moths in one lot and if, after examination, a few worms are found pebrinised, it would not be economical to throw away all the worms. The best practical method for the seed rearer would be to get cellular seed from the Government Grainage ; rear the progeny of say 10 moths in one group and get his worms, etc., examined by the Department and issue only those cocoons for seed which have been spun by healthy worms. If he rears 100 layings in 10 batches, it would be easier to throw away one batch of 10 layings if found affected with pebrine, than to throw away all the 100 layings, which has to be done if the system of group rearing is not followed. The seed cocoons produced will also give satisfaction to the sericulturist who purchases the cocoons and also to the Government Grainages. The co-operation of the Union members is requested in extending this line of work also.

Improvements of Rearing Methods.

The seed may be good but if the rearing conditions are not suitable, the result will not be satisfactory. At present the local sericulturists give less space and less number of feedings in a day than is good for the health of the worms. Generally worms of 100 layings are kept in 5 or 6 trays (70 to 80 Sq. ft.) in the latter days of the 5th age. They generally give about seven feedings a day. In one experiment conducted at Channapatna the following were the results :—

Worms of 80 layings kept in 8 trays in V age (110 Sq. ft.)

Yield of cocoons 39½ lbs. 1 lb.=551 cocoons.

Worms of 80 layings kept in 4 trays in V age (60 Sq. ft.)

Yield of cocoons 32 lbs. 1 lb.=590 cocoons.

In the above experiment the worms were given on an average about 11 feedings a day in the early ages and 9 feedings in later ages. This experiment clearly shows the desirability of giving more space and more leaves to the worms. The co-operation of the Union members is requested to carry out this experiment also on a large scale.

Results of Ragi Varietal Tests.

Professor B. Venkatanaranappa, M.A., has sent in the following report as regards his Ragi varietal experiments :—

Locality.—Kalhalli (part of Jodi Raghunathapura, Dodballapur hobli).

Varieties sown.—H2, H40, H43, H44.

Date sown.—29th July, 1922. *Date of harvest.*—15th December, 1922.

Quantity sown.—1¼ measuring seers each (about 2½ lbs. each).

Type of soil.—Sandy loam.

Previous history of soil.—Had groundnut crop the previous year ; not manured that year.

Present cultivation.—Well ploughed with country plough. Cattle manure one cartload supplied for the whole plot ; sown under favourable conditions ; rains failed in the middle ; field properly weeded.

Each sample sown in 3 separate alternate plots as directed. Extent of each plot about 1/13 guntas so that each variety had about 4 guntas to grow in. The plots were separated from one another by *avare* crop. For comparison the same quantity of H22 ragi was sown on the same extent of land on the plots at the ends.

Yield.—The following quantities of grain and hay were obtained in each case :—

Grain	Seers per acre	Hay lbs. per acre
H2	171	397
H40	185½	425
H43	166	332
H44	136	332
H22	157	425

NOTES AND COMMENTS.

Our Annual Meeting.

The Sixth Annual Meeting of the Mysore Agricultural and Experimental Union was held in the Daly Memorial Hall, Bangalore, during the second week of December, 1923. Our Dewan Saheb, Mr. A. R. Banerji, M.A., I.C.S., C.I.E., opened the meeting with a very sympathetic speech full of valuable suggestions, and our genial President, Dr. Coleman, who had, only a few days before this, returned after an absence of eight months from our midst, presided over the deliberations. The first three days were, as usual, devoted to discussions of reports on various agricultural experiments and subjects, and the visiting of the Departmental Laboratories, and the last day was spent on the Experimental Farm at Hebbal. Members, official and non-official, came from different parts of the State, and visitors also mustered strong. Many of the members, especially the non-officials, took a very prominent part in the discussions on what might be considered to be the most absorbing topic of the session—the present agricultural depression in Mysore and the best means of tiding over it. Interesting as the deliberations of this body of practical agriculturists have always been to us, the proceedings of the present sessions have the additional interest of a direct bearing on the present exceptionally acute situation in the State brought about by an almost complete failure of both the monsoons in the *maidan* districts of Mysore during the year. The questions that awaited a thorough discussion and practical solution at the hands of our members were of more than usual importance and it is very gratifying to note that our members succeeded in throwing much valuable light on the problems and drew up a highly practicable scheme of relief measures, which has subsequently been approved by Government, and is now being given effect to in the affected areas.

As a detailed report of the proceedings of the discussions held and the various interesting papers read at the meeting are printed in the Journal *in extenso*, we do not propose dwelling at length on them. We wish, however, to draw the special attention of our readers to the prominence given to the question of fodder supply and the methods

proposed to be adopted not only to meet very exceptional situations such as the one we are just now passing through, but also to provide some permanent insurance against similar, though less acute, ones, which are, unfortunately for us, by no means few or far between in Mysore. The Colonization scheme which was inaugurated by our Union as early as 1918 received an enthusiastic reiteration for being pressed for the favourable consideration of Government paying special emphasis to the idea of grouping a number of these colonies together like our old *agraharams* to make it easier to afford social, educational and medical facilities to the families of the colonists. The usual annual visit of the members to the Hebbal Farm elicited much enthusiasm and although the season was too late for the usual inspection of the standing crops of ragi, ground-nut and other dry crops before the harvest as in the previous years, to get an ocular demonstration of the various field experiments that are being tried on the Farm with these staple crops of the State, the members took a great deal of interest in the various varietal and manurial tests of sugarcane and paddy that are being conducted on the wet area. The working of the new Mysore plough, the work of the Dairy and the sheep-breeding work were also much appreciated.

The celebration of the Agricultural School Day which synchronized with our Field Day, and the sports, and dramatic and other entertainments connected with it contributed considerably to the social side of our gathering.

Considering the very pleasant time our members spent in the company of co-workers in the common cause of the improvement of Mysore Agriculture, the lively and informing discussions on current and important agricultural problems, and the definite and practical plans drawn up for future work, the session must be considered to be a very great success. There is no doubt that the Union is serving as "the eyes and ears" of the Department out in the districts.

SELECTIONS.

Extracts from the Report of the Committee appointed to consider the question of the Maintenance and Improvement of the existing Cattle Breeds of the Bombay Presidency.

Fodder.

(i) Existing State of Affairs.

From all the evidence obtained and from the personal experience of the Committee it was unanimously decided that the first step necessary to cattle improvement is the improvement in the existing conditions of fodder, especially as regards silage and storage of hay and *kadbi*.

In the old days the breeders moved with their cattle from one part to another. Like all nomadic and pastoral people their movements were guided by the supply of water and pasturage ; when these failed in one place they moved on. Moreover, experience taught them that certain grazing grounds were best at certain seasons, thus they knew what to seek and what to avoid. This constant migration afforded their cattle not only that variety of food and change of ground so essential to health, but in a way acted as a preventative of diseases, the dead and very sick were left behind, the weak stragglers became a prey to wild animals and so a process of natural selection took place. The fact that this method of cattle raising is no longer possible on a large scale is one of the causes of the recent deterioration.

Formerly as the fodder presented no difficulty, cattle were raised for practically nothing. To-day owing to the spread of cultivation and rise in the price of fodder the case differs, breeding and raising cattle cost a great deal more than the price realized, except perhaps in parts where grazing is still available. Hence cattle raising on the ranching system, formerly a lucrative business, is now fast dying out.

Naturally the loss of grazing is causing a certain amount of discontent, both amongst the stock producers as well as the users of both draught and milch cattle. In parts of the Presidency notably Nasik and Khandesh and along the rugged tracts adjoining the Western Ghats, an ample supply of grazing is still available, but this suffices only for a portion of the year. It is an established fact that cattle brought up or maintained on these monsoon grasses thrive exceedingly well for the

time being, but when left to maintain themselves on dry indigestible fodder for the remainder of the year, a very rapid deterioration sets in which is not only injurious to the parent stock but worse still in its effects on their progeny. Successive years of this treatment have reduced the cattle to the standard we see to-day.

The present method of sub-division of lands by the Hindu law makes it difficult for the small cultivator to replace this professional breeder, as the holding produces barely sufficient fodder to maintain essential cattle ; but the Committee are uncertain as to whether an enlargement of these holdings to the economical standard would have the effect of replacing the professional breeder.

This extinction of the professional breeder who depended entirely on grazing for his livelihood was noticed in the Kapadvanj Taluka of the Kaira District and Viramgaum Taluka of Ahmedabad District, where the *Rabari* has completely abandoned his profession. Again in the Deccan there was formerly a class of person known as *Gowsavi*, who at one time took away dry cows and buffaloes and grazed them on the vast areas of grazing land then available. Now owing to grazing restrictions and the very rapid growth of cultivation, a large portion of these lands is not available, consequently this very useful class of person is practically extinct and the needful work of relieving the large towns and villages of their dry stock during the time of scarcity is also lost.

From the foregoing it will be seen that at the present time the grazing lands available do not meet the requirements of the country.

The following figures will show how India is situated as regards the facilities offered as compared with other countries for raising good cattle:—

Name of country	Relation of cultivated land to grazing area	
	Cultivated	Grazing
Great Britain and Ireland	3	1
Germany	6	1
New Zealand	3	1
United States	16	1
Japan	6	1
India	17	1

In the United States there are 13 acres of grazing land per head of live-stock, whereas in India there is only an area of 1.3 acres. This condition as it stands is very unsatisfactory; but when one remembers that such large areas are necessary in temperate and sub-tropical countries, where the growth of grass is encouraged, not only by the climate, but also by public and Government enterprize it stands to reason that more land per head of live-stock is essential in a tropical country like India where practically nothing has been done to improve the quality and capacity of these lands.

Both from expert evidence and from evidence obtained by breeders of cattle, the Committee are agreed that the present forest grasses which are stored by Government do not meet requirements during a famine year, for the following reasons :—

(1) The majority of the hay supplied by the Forest Department not only has to be sent to a great distance but is admittedly of an inferior quality, the cultivator going so far as to state that it is more injurious than beneficial, and he will only use it as a last resort. However this may be, it is an absolute fact that the fodder saves many cattle in famine years. Evidence was given by the Conservator of Forests, Utilization Circle, that the improvement of hay supplied for famine fodder purposes was not a practical proposition.

(2) Owing to the long distances fodder has to be transported by rail and road, there is great waste and enhancement of price, while the facilities for transport being poor, delivery cannot be effected when most urgently needed.

(3) Silage is practically not made at all, though the material for producing it is available in many places. In tropical parts of America production of silage alone makes cattle keeping and dairying possible. In India, were silage making developed, both the quantity and quality of the fodder would be increased. Whereas hay-making clashes with the grain harvest and is nearly always delayed in consequence, grass is ready for cutting for silage a month before the harvest when labour is available. Only where the rainfall is excessive might silage making possibly be difficult. From the evidence good *kadbi* is available in large quantities in good years.

(ii) Proposal for Improvements.

The Committee recommend as follows :—

(1) So far as possible sufficient grazing land should be reserved for grazing and fodder for each village in the talukas selected by the Committee for carrying on the business of cattle breeding. This reservation of grazing land is, however, to meet the needs during semi-famine years.

(2) That *kadbi* or good grass which can be obtained in every district during a fair season at a cost of Rs. 10 to 15 a 1,000 lbs.,be purchased and stored in suitable centres in or near each of the districts frequently visited by famines. This year (1922) being very favourable, part of the expenditure allotted to jungle grass should be devoted to purchasing, pressing and storing *kadbi*. This fodder should be sold at a small profit to the villagers during famine years. The stores of *kadbi* should gradually replace the present famine fodder grass now collected and stored by the Forest Department.

(3) With a view of making the people self-reliant, of providing the best kind of fodder available near famine-stricken areas and to reduce expenditure, especially on transport, the Committee strongly recommend that the Village Panchayats in and near such areas be induced to start fodder, particularly *kadbi* storage, Government granting pecuniary assistance at first. Advantage should be taken of the present good year.

(4) That as observed, a very large quantity of *kadbi* fodder is wasted at present for the want of converting it into a suitable farm for cattle to consume, Government should take steps to introduce and demonstrate the use of suitable hand or co-operative power chaff-cutters in villages all over the Presidency.

(5) That Government demonstrate on a large scale the use of silage by erecting suitable cheap silos and by financially helping in the form of *tagai*, Co-operative Cattle Breeding Societies and large cattle breeders to preserve fodder in this manner, and thus obviate the waste of much useful material.

(6) That Government erect power pumping plants on suitable sites either in the famine tracts, or in adjacent tracts, where fodder can be raised by mutual agreement with the land-holders in times of famine.

(7) It was brought to the notice of the Committee that there exist in the Satpudas large areas of good grass land which could provide a great deal of excellent grazing, hay and silage, but that owing to scarcity of water for both man and beast no advantage can be taken of these areas. The Committee recommend to Government that the services of a competent Irrigation Officer be lent for ascertaining whether difficulties could not be got over by providing small storage tanks and wells.

The Committee, after hearing the evidence of several persons, both cultivators and breeders, therefore recommend to Government that certain areas well situated for cattle raising such as Kapadvanj in the Kaira

District and Jambusar in the Broach District and similar areas in other breeding tracts, be especially assigned to the raising of cattle by professional breeders. This will prevent discontent between the cultivators and the breeders and at the same time will ensure supervision by the Cattle Breeding Department.

Cattle.

(i) Existing State of Affairs.

Some sixty years ago in the Bombay Presidency the cattle indigenous to the different tracts were kept pure, and owing to the cheap method of raising cattle, fine specimens of the different breeds were to be found. To-day, owing to the ravages of famine, the spread of disease, by the more convenient access from district to district by rail or road, by the restrictions on the movement of the professional breeders, interbreeding and the indiscriminate mixing of different breeds, the cattle have deteriorated very rapidly.

The last census figures show that in the Bombay Presidency there were in 1915, 19,50,354 cows to produce the necessary draught cattle to plough some 2,79,69,602 acres. In the year 1919–20 there were 16,36,703 cows to produce the necessary draught to cultivate 2,77,18,894 acres of land.

Now if we take as an average that one pair of bullocks will plough and cultivate 15 acres of land, taking the Presidency on a whole in 1919–20, we would require 36,95,852 bullocks. It will be seen that the number of plough cattle is almost double that of the cows which naturally means that over 50% of the Presidency draught bullocks are imported from other provinces. The cultivator of the Dharwar District who requires a pair of good cattle has to pay some Rs. 400 to Rs. 600 per pair. These prices are likely to go on increasing unless the Presidency produces better and more cattle.

There are several pure breeds of cattle each particularly suited to the tract in which it is found. These are however fast deteriorating. We have the Kankrej and Wadyal in Gujerat which are eminently suited to the sandy soils and peculiarly deep rutted roads found all over Gujerat.

The Dangi found in the Dangs and Western Ghats are particularly useful to the hilly and rainy tracts in which they are found. This hardy animal is best adapted to rice cultivation for which no other breed can replace it.

The Committee were pleased to notice that pure bred and good cattle are given a great deal more attention than mongrels, and feel

sure that the more the cattle are improved the more will care and attention be bestowed. During the famine of 1920–21 in Nagar District in spite of scarcity and high prices good cattle were cared for by the people whereas the mongrels, being comparatively valueless, were starved to death or sold to butchers.

Purity of breed and trueness to type are most essential for a stud bull. Until the people learn to value and are willing to pay for these qualities, cattle breeding must remain as expensive and losing business which can only be conducted by Government.

The Khillari breeds are very essential to the stony country and have been brought up under very trying conditions. No other breed could survive on the small pasturage and meagre food found in their tracts.

The Krishna Valley, a large massive breed, is very well suited to the soft deep soil of the Krishna Valley river and could not be replaced efficiently by any other breed. The Amrit Mahal is again very useful in the black soil tract of the Dharwar District, where frequent and fast haulage is essential to good cultivation. The only tracts which are not provided with some form of pure breed suitable to the local conditions are the Central Deccan, Malnad and Rainy tracts of the Dharwar District. The selecting or evolving of a breed to suit the conditions of these tracts must be done by Government.

The Committee do not recommend the introduction of any foreign blood from outside of India. The cattle of India are particularly prized owing to their comparative immunity to nearly all contagious and fatal cattle diseases, this being a very essential quality for the poor cultivator. Similarly the keeping of a breed that will thrive on the local conditions is very essential, and this naturally favours the selection of the local pure breed. Hitherto the draft qualities of the bullocks of almost all the different breeds have attracted undue attention to the total neglect of the milk-producing capacity of the cows. The fact that the cows give little or no milk makes cattle breeding unremunerative and discourages enterprize in the direction. By a system of selection, however, and by milking, the cows unable to support their young would be discarded. Stud bulls would be taken from cows producing most milk.

The Committee notice that very fine specimens of the indigenous breeds are to be had in Mysore and Jamkhandi States, and British India has had to depend a good deal on these States for bulls both as stud bulls and working animals. The demand has so increased on these States that the price is the encouragement that has been offered in the past to raise good cattle. Large areas are reserved for grazing and

numerous Jatras are held annually, where prizes are offered, and further the States themselves have maintained large pure breed herds.

The Committee feel that the time has come when Government must do something similar if the cattle industry is to be encouraged. Quite as good cattle can be raised in British India provided good facilities are offered and the people encouraged.

State regulation is required in connection with the production of good cattle, improvement of the existing poor cattle and prevention of the present harmful milk and butter supply. To raise better cattle, and at the same time keep down expenditure, the following are essential :—

(*a*) *Regularity of Calving.*—This can only be gained by breeding from selection which needs the keeping of records which the professional grazier in India cannot do.

(*b*) *Early Maturity.*—This can only be obtained by breeding as above and by good feeding.

At present, it is impossible for private persons to establish the opening of up-to-date scientific milk producing and selling owing to the want of regulations. The present unscrupulous milk producer is able to adulterate his milk in many ways. This is particularly noticeable in Poona, Bombay and Ahmedabad. A considerable supply of milk is exported to Bombay and other places from Anand. This milk contains boric acid and formalin, added as preservatives in such quantities as to be highly injurious.

Scientific dairies are under supervision necessarily entailing expense. The produce, however, is superior ; but in a country like India where cleanliness is at a discount such produce is unable to compete with a filthily and more cheaply manufactured article.

On the evidence before the Committee and from the latest cattle census report, it has been noticed that the cow is being used less and less each year for the production of milk ; this necessitates the keeping of cows to produce draught bullocks, and buffaloes for producing milk. The result is that two animals have to be fed to do the work of one. The Agricultural and Veterinary Departments in the past have encouraged this state of affairs by breeding bulls for the sole purpose of improving the draught qualities of the bullock at the expense of the milk-producing qualities of the cow. This very harmful practice must be stopped. It is a well-known fact that the Holstein of Denmark, the finest milk producer in the world, supplies the best draught bullock for the wine-growing tracts in Europe. In this Presidency it has been noticed that all the pure breeds of cows produce hardly enough milk to rear their own calves, much less supply their owners with milk too.

Milk in India to-day, is anything from 2 to 6 times dearer than in any other country in the world. This is due to the poor milk-producing qualities of the indigenous cattle. The evidence before the Committee proves that the price of milk is rising rapidly every year. A number of enterprising people have started dairies but all, almost without exception, have failed, firstly owing to the poor milk-producing qualities of the cattle, secondly for want of protection by legislation ; and thirdly, for want of encouragement by Government.

The Committee whilst touring in Gujerat took the opportunity of visiting some of the so-called dairies in Ahmedabad where the bulk of the butter and other dairy produce is manufactured for the whole of India. The Committee were surprised to find that this industry is carried out under the most filthy and dirty conditions imaginable. These so-called "Dairies" are situated in the most insanitary by-lanes of the city. The butter produced under these conditions is sold all over India and a certain amount is exported even to Great Britain. It is a well-known fact that milk and its products are the best medium possible in which injurious bacteria and germs of Typhoid, Diptheria, Cholera, etc., thrive and in which they are carried and spread over the whole of India. It is essential for the public health that production on honest and scientific lines should be made a financial success, so that the public at large will get a safe and sure supply of milk and its several products.

Another very important point is the milk supply of large towns. To improve this, it is essential that Government undertake and breed one or two purely Dairy strains of cattle.

The Committee visited several Pinjrapols to see if any use could be made of them in assisting the improvement of the cattle of the country. After careful investigation and from inquiries made from the Managing Committees of these Pinjrapols and from the manner in which they are run, the Committee find that no useful work can be undertaken in these.

(ii) Proposals for Improvements.

Improvements of the cattle of the Presidency will not only take time but will also entail great expense. The Committee recommended that for the time being 4 or 5 talukas, in which the present pure breeds of cattle are found, be taken in hand and every facility and concession be afforded in these talukas to grow pure breed cattle of the breed indigenous to the tract.

The Committee now unanimously agree :—

That though the professional breeder must in time become extinct as the method of producing live-stock on the open "ranching" system

does not now economically produce good cattle, still until such time as the larger landholder can be induced to take up cattle raising as a side industry to his cultivation, everything possible must be done to encourage and support him.

The Committee recommend to Government that Government Farms be started as early as possible for the following breeds and that particular attention be given to the milk-producing capacity of the cows. It is essential for the well-being of the calf that the milk-giving capacity in the mother should be encouraged and the draught qualities at the same time can be kept up to a high standard. Hence in all breeds attention must be paid to both milch and draught qualities:—

* * * * * * *

Kankrej, Wadyal.—Chharodi, District Ahmedabad, already in existence.

Gir, Malvi, Surti Buffaloes.—At Pavagarh in the Panch Mahals District.

Dangi.—In the Nasik District.

Khillari.—In the Satara District.

Tapti Khillari.—In Shirpur Taluka, of the West Khandesh.

Krishna Valley.—In the Ainapur Taluka, Belgaum District.

Mysore Breed.—Bankapur, District Dharwar, already in existence.

The Malnad tract of the Dharwar District must be provided for.

The Committee are at present unable to recommend any special breed for the Central Deccan. The breeds existing are more or less of a mongrel type. Several of the pure breeds are, however, to be seen, but these deteriorate in times of scarcity. The Committee recommend that a farm be started in the Central Deccan, where experiments can be carried out of breeding pure cattle and crossing the several breeds to discover, or evolve, a breed that will be suitable to the conditions of this part of the country.

The Committee after seeing and carefully examining the site of Pavagarh (Zankaria) in the Panch Mahals District strongly recommend to Government that the whole of the site measuring some 3,662 acres should be kept primarily for milk supply (*vide para.* 30). A farm should be started to breed bulls both from Gir cows and also from Gujerat buffaloes of known milking qualities, these two breeds as milk-producers being in the highest demand in the Presidency. In addition the Committee recommend that the Malvi breed be bred here as well as the Malvi bullock being a notably good draught animal and prized in many parts of the Presidency. The Committee also recommend that the proposals already

submitted to Government by the Agricultural Department for opening up a Fodder Farm and Bull Breeding Farm on the above site be started as early as possible. The farm can also meet a great demand for fodder in famine times.

The Committee unanimously agreed that the Government Bull Breeding Farms should be restricted to a certain limit. It is suggested that each farm should keep 100 cows ; these to be replaced from the farm bred stock. It will be seen that this number of cows cannot possibly grow sufficient bulls to meet the needs of the Presidency as a whole. It is therefore recommended that the Deputy Director of Agriculture for Animal Breeding and his staff shall concentrate all their energies in the four talukas selected by the Committee in each of the breeding centres and on the Experimental Farms suggested for the Deccan, the Farm Manager taking under his charge all the villages in which breeding is carried on in the talukas in which he is working. By this means it is anticipated that sufficient good bulls can be bred in their natural homes for putting out in the remainder of the Presidency. The propaganda work of improving other parts of the Presidency should be carried on by the territorial Deputy Director of Agriculture. The latter will apply to the Deputy Director of Agriculture for Animal Breeding, for bulls, which will be distributed from the villages in which breeding operations are in force.

The activities of the Animal Breeding Department also should be restricted for the present to 4 or 5 talukas in each of the pure breed cattle-breeding tracts.

The Committee during their investigation found that there is a good demand for bull-buffaloes. These at present are only to be had in Gujerat. The Committee cannot recommend a farm being started for each of the districts but suggest that advantage be taken of all Agricultural Schools and the present and proposed cattle breeding farms to breed a milking strain of buffalo. A small number of buffaloes, say 6, should be attached to each school and 12 to each breeding farm with one stud bull. The produce in each case can be readily sold either in the form of milk or ghee. This will give the students sufficient material to learn milking, the care of cattle and the raising of calves. No extra charges will be necessary as the present staff could do the work and the produce would pay for the feed.

In this manner a good pedigree and acclimatized bull-buffalo will be bred to put out into the villages.

The Committee recommend :—

(1) That an inspector be appointed for each of the tracts selected

and, as the farms open, the Inspector should manage the farms and do the district work as well.

(2) That these farms should be liberally treated as regards finance, so as to get the best results and that they should not be expected to "pay" their way.

(3) That Government breed bulls at the above farms and these be put out into the villages of the tracts selected. That the present rules for the Premium bulls should stand, with the exception that Government pay Rs. 10 instead of Rs. 4 which is now far too little. as maintenance. That the bulls on the farms be valued at the current market rate and that these be given out on a concession of a $\frac{1}{4}$ (one-fourth) of their value. That the bull always remains the property of Government and as each bull is rejected, it should be replaced free of cost and the old bull castrated and sold or used elsewhere.

(4) That Government empower the Deputy Director of Agriculture to replace any entire bull in the village by a farm bred animal, the replaced bull to be castrated and sold and the amount credited to Government. In the event of a bull being dedicated to a God it should be placed in a Pinjrapol.

(5) That Government legislate for the castration of all entire breeding bulls not approved of by the Animal Breeding Department, if not kept under proper restraint and prevented from wandering.

(6) That Government allot an adequate sum for holding an annual show in each of the tracts ; these to be held whether the year is good or bad. The Committee consider this one of the most essential points in encouraging the breed of good cattle, and take this opportunity of drawing attention to the importance attached to shows and prizes in all the more advanced countries of the world.

(7) That the territorial Deputy Director control the breeding and improvement of all the other tracts of the Presidency, the advice and assistance of the Deputy Director of Agriculture for animal breeding being called for when required. The result of the adoption of this proposal would be to obviate the present overlapping.

(8) Where no farms exist at present or where existing farms are unable to provide Premium bulls, carefully selected bulls shall be purchased for the purpose at fairs and "Jatras" until a supply becomes available from a farm.

(9) Until such time as the farms are opened, the Committee recommend to Government that a sum of Rs. 7,500 be allotted annually for the

purchase of the most likely bulls from fairs and "Jatras"; these to be put out on the premium system as suggested above.

(10) That Government start as early as possible the bull breeding farm at Halol. That the breeds recommended be kept and these be treated as purely milking strains.

(11) That a farm be started in the Central Deccan to ascertain the best breed to be introduced or to evolve a new and suitable breed.

(12) That the Tagur Farm be maintained and used as a bull Breeding Farm for a breed suitable to the Malnad tract and be run as a subordinate farm to Bankapur Farm.

(13) The Committee are unanimously agreed that Government take the offer of the Sangvi Cattle Farm which has been made by the Shirpur Agricultural Association at the earliest date possible, and that the farm be brought up to the standard of the other farms recommended.

To safeguard the supply of good milch cattle, it is essential to take steps to reduce their slaughter. Such cattle are reared in the country by one class of person and then purchased in the towns by another rich class, who milk them for a short time, then sell them off to butchers. In this way the best milch cattle in the country find their way to Bombay where they are soon slaughtered and their calves lost.

The Committee, with a view to encourage the rearing of milch cattle, and as the only practical means of reducing their slaughter recommend that dairy farming be encouraged outside all town limits by giving out suitable lands at the maximum concession rate.

The Committee wish to bring to the notice of Government the great necessity of teaching Dairying and Animal Husbandry in a more practical form. This industry has failed in the past and is likely to fail in the future, for the want of good practical men. The industry to-day is being run by laymen who mostly know little or nothing of the business. Government can hardly advocate the starting of private concerns owing to the dearth of efficient managers. The teaching at the Agricultural College does not fit a man to carry on the work. The theoretical side is well catered for but the practical or more essential side for this country at present is sadly neglected. Without good men in the field, who can demonstrate the practical uses and benefits of the industry, Government cannot expect to make any advancement.

Veterinary and Suggestions.

It has been brought to the notice of the Committee that in spite of the fact that indigenous cattle are far more immune to disease than foreign cattle, still in the hot weather, and especially during famine,

when food is scarce, contagious diseases are common in India and do an immense amount of damage.

To meet this the Committee recommend :—

(i) That steps be taken to make it criminal to allow the cattle of an infected village to leave the limits of the village to attend public fairs and sales.

(ii) That inoculation and vaccination be carried out on a larger scale than at present.

(iii) That the Revenue authorities be asked to report an outbreak of contagious disease as promptly as possible to the veterinary authorities.

(iv) That all neighbouring Native States be asked to inform the Government Veterinary Department of the outbreak of any disease in their States as early as possible and to prevent cattle from an infected State entering British territory, as far as possible.

(v) That suitable measures be adopted in each village to dispose of the carcasses during an outbreak.

The Committee realize that these recommendations will entail an expenditure on additional staff for the Veterinary Department, but believe that the extra sum expended will be adequately repaid.

Conclusion.

The Committee recommend to Government that the present Committee be appointed permanently to meet once or twice a year to discuss and lay out the lines to be followed each year, for the following reasons :—

The improvement of the cattle does not entirely rest on expert knowledge in breeding though this is very essential ; the question involves many other very intricate matters, such as religious sentiment, grazing and the reservation of lands, diseases and cultivation ; while the great weight of unofficial opinion is also of extreme importance. As in the Agricultural Department the work is practically being controlled by a mixed Board, so the Committee consider that to get the best results from the Animal Breeding Branch of this Department, a Board consisting partly of non-officials should be permanently appointed, which would to a certain extent control the policy of the Department, make necessary suggestions to Government from time to time, and insure work being carried on continuously. The Cattle Breeding Branch of the Agricultural Department must have a continuous policy, as good work done in one year can by neglect easily be lost in one month. The Governments of all other civilized countries have allotted and set aside a large

sum of money for cattle improvement, and this money is well repaid from the results obtained. In India the improvement is not only essential to the welfare of the country but the religious sentiment of the greater portion of the population calls for some substantial help to maintain and keep the cattle of the country in a prosperous state.

The Committee finally take the liberty of pointing out to Government that from all the evidence obtained and from public opinion Government can at no time pay too much attention to the improvement of the cattle, both draught and milch, of the Presidency and that every rupee spent will have the wholehearted support of the entire public of the Presidency. This expenditure apart from religion and sentiment, is essential from an economic point of view, as milk at a reasonable price is the cheapest and most beneficial form of food any nation could have, especially in India, where the majority of the people are vegetarians. The infant mortality in India has been great in the past and is higher to-day than in any other country. This is due in great measure to the short supply and high price of milk. The remedy lies in the improvement of the cattle.

Finally the Committee suggest that if their recommendations should meet with the approval of Government, this report should be translated into the vernaculars and published.

THE MYSORE AGRICULTURAL AND EXPERIMENTAL UNION.

Instructions for conducting Sunflower Trials.

Sunflower is best grown for ensilage purposes only, and gives the best results when used in that way. If allowed to mature seed and become dry the leaves and stalks become dry and pithy and of no use for feed. If ensiled in the right condition, sunflower makes an excellent fodder which is well relished by all stock. At first the cattle may show some aversion to the fodder in this form, but after two or three feeds will take to it readily and relish it well. In this condition it is also a valuable and nutritious fodder.

Growth.—One of the characteristics of sunflower is its ability to withstand drought, but at the same time it will do better under more congenial climatic conditions. Under ordinary conditions on dry lands, a crop of 5 tons of green fodder to the acre should be obtained, but on well-manured land and suitable seasonal conditions nearly twice that yield can be obtained. Very little experience has been obtained with sunflower as an irrigated crop in this country but it is known that heavy watering is not required, and that good yields can be obtained where drainage is good and an excess of water is avoided.

Seed should be sown at the rate of 15 lbs. per acre in rows 3 feet apart, the plants being about 4 inches apart in the rows. Cultivation between the rows should be done as long as possible, roughly until the plants are about two feet high. On account of the heavy leaf foliage thrown out by plants, the ground after this stage becomes heavily shaded, and weeds are kept well under control. In fact sunflower seems to be a particularly useful crop to help in the eradication of weeds.

The crop should be cut for putting in the silo when about one-third of the plants are in bloom, and certainly not later than when half the crop is in full bloom. The crop should not be cut faster than it can be carted to the silo, as it wilts very rapidly, and a loss of weight results. The best ensilage is made when the crop is ensiled shortly after cutting. Cut crop should not be left lying over night if this can be avoided.

For an acre of sunflower, when a five-ton crop is expected, a circular pit silo, 6 feet in diameter and 15 feet deep will be required. If possible the stalks should be cut into short lengths when put in the pit, and must be laid flat and carefully packed and trampled down, the whole being covered with a layer of earth when the pit is completely filled. For further details regarding the manufacture of ensilage attention is drawn to the article on the manufacture of ensilage in Vol. IV, No. 2 of the Journal of the Mysore Agricultural and Experimental Union dated 1922.

[W. D.]

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The Mysore Agricultural and Experimental Union.

Proceedings of the 1923 Annual Meeting.

The Sixth Annual Meeting of the Union was held in the Daly Memorial Hall on the 13th, 14th and 15th December 1923. The Annual Field Day was held at the Hebbal Farm on the 16th December.

Thursday, the 13th December, 1923.—*First Day.*

The proceedings commenced at 12 noon. Rajamantradhurina A. R. Banerji, Esq., M.A., I.C.S. (Retd.), C.S.I., C.I.E., Dewan of Mysore, presided at the opening meeting. The following among other distinguished guests were present :—Mushir-ul-Mulk Mir Humza Hussein, Esq., B.A., B.L., Member of Council, K. R. Srinivasa Iyengar, Esq., M.A., Member of Council, P. G. D'Souza, Esq., B.A., B.L., Director of Industries and Commerce, K. H. Ramayya, Esq., B.A., Bar-at-Law, Registrar of Co-operative Societies in Mysore, M.G. Rama Rao, Esq., B.A., Retired Conservator of Forests, B. Venkoba Rao, Esq., B.A., Deputy Commissioner, Bangalore District, M. G. Krishnaswami Rao, Esq., B.A., Commissioner, City Municipality, Father A. M. Tabard, M.A., M.R.A.S., M.B.E., etc., President, Mythic Society. The non-official members of the Union mustered strong in numbers as usual, while a good number of non-member agriculturists also attended. The Daly Hall was crowded with visitors.

The proceedings commenced with an invocation and a welcome song composed by Mr. M. Vasudeva Murthy, B.Ag. Mr. H. Srinivasa Rao, Retired Deputy Conservator of Forests and the Vice-President of the Union welcomed the guests in a short speech, published elsewhere in this issue. The Secretary then read the annual report. Dr. Leslie C. Coleman, M.A., Ph.D., Director of Agriculture and the President of the Union in welcoming the guests referred to the trying agricultural conditions of the year brought on by the failure of the monsoons and suggested that a great part of the time of the meeting this year should be devoted to the discussion of the fodder situation in the country.

The Chairman then delivered the Address printed elsewhere.

Discussion on the subject of fodder supply was taken up immediately

after the Chairman's address, Mr. W. Davison, B.S.A., Live-Stock Expert in Mysore, leading the discussion. Mr. Davison outlined the circumstances which had brought about the present fodder shortage and suggested certain definite lines of action for being immediately taken up. His speech is published *in extenso* elsewhere.

Mr. A. K. Yegnanarayana Aiyar, M.A., Dip. in Agri. (Cantab.), N.D.D., etc., Deputy Director of Agriculture, followed Mr. Davison. As regards shifting cattle to the Malnad, Mr. Yegnanarayana Aiyar said that people of Nagamangala, Mandya, Gubbi, Nittur, etc., are used to driving their cattle to the Malnad in years of fodder scarcity. But the idea was a new one to the ryots of Bangalore and Kolar Districts. He had been touring during the days immediately prior to the meeting and had strongly recommended this idea to the ryots but it had not been received favourably by them. The ryots were not willing to leave their homes to take charge of their cattle and to go far away from their places. As regards Kolar district, concentration camps should be thought of. The shortage of water was as serious as fodder shortage in that district. The camps should, therefore, be arranged where water could be tapped and suggested the beds of the two Pinakini rivers for the purpose. Simultaneously with the organization of camps other facilities should also be provided to the ryots. They must be allowed to lop trees of all kinds; must be encouraged to dig wells in tank beds as well as outside. Sugarcane was being harvested just now in parts of the affected districts and the tops of cane, etc., would provide fodder for another two months. In order to be prepared for the immediate future large number of wells could be sunk during the period. During Sir Seshadri Iyer's administration two officers were deputed to go into the question of sinking wells. A survey was made to find out areas where artificial supplies of water could be tapped. The experts reported that nowhere in Mysore was there any chance of tapping an underground source of water. The survey conducted by some experts some time should not be accepted as final. A survey should be made again. An annual appropriation should be made in the budget for an agency to sink wells.

For the immediate future, fodder must be brought from the Malnads and stocked. People must be persuaded to grow only fodder crops on lands under wells. The ryots of channel areas must be persuaded to raise another crop—a catch crop such as irrigated short season ragi, which would supply both grain and fodder.

The *gomal* as such must be done away with and given over for the cultivation of fodder crops only.

Mr. M. Venkata Rao of Siragola Farm, Kadur District, pleaded for the greater co-operation between and co-ordination of the work of departments other than Agricultural. He wanted greater facilities and concessions for the quick transportation of cattle. In his opinion what was important was not the question of providing wells but that of providing the power to lift water from the depths. He wanted the Engineering and Electrical Departments to provide this help in large measure. He recommended prohibition of the export of concentrated feed from the country.

Mr. Girimaji Rao of Kolar contended that fodder could not be grown on tank beds now as there was no moisture there at all. He wanted the sinking of wells to be immediately taken up. He wanted fodder depots established at least at every taluk headquarter.

Mr. H. Srinivasa Rao agreed that sinking of wells must be taken up immediately and added that fodder crops should be raised. In his opinion the transport of cattle along long distances was a difficult, if not impracticable, problem and besides he was not sure if cattle would flourish in the new places to which they were taken.

The President pointed out that with regard to the transport of cattle there were two points, one was that of the owners taking their cattle and the other was that of Government doing it for the owners and explained the difficulties in the way of transporting fodder over long distances.

Mr. R. Gopalaswamy Iyer reminded the meeting of the scope there was for the spread of contagious diseases in connection with large movements of cattle. Even apart from this he thought that the marching of cattle to the Malnad was impracticable. He did not think the transport of hay was an insurmountable difficulty. Once in the past hay had been brought from Bellary.

Mr. D. G. Ramachandra Rao enquired that in case Government purchases the ryot's cattle with the view of returning them to him when better conditions returned, what would be done if the ryot had no money to repurchase his cattle. The President thought that a takkavi loan could be given in such cases.

Mr. N. Rama Rao wanted to know from Mr. Davison if there was sufficient grazing in the Malnads for a large number of cattle, and thought that there should have to be a picking of good cattle only for being sent to the Malnads. Mr. Davison replied that there were nearly 20 lakhs of cattle of all sorts in distress and grazing resources in the Malnad were enough for ten per cent of that number.

Mr. Ibrahim Khan was for cattle being transported to the Malnads but wanted Government to do it.

Mr. M. S. Lingegowda opined that ryots would themselves pick the cattle and take them to the Malnads provided they were informed where grazing was available. No arrangements need be made in the form of halting camps on the way.

Mr. Venkatasami Gowda of Santhehalli was certain that Kolar people would not take their cattle to the Malnad. Fodder must be supplied to the Kolar District. He wanted the Taluk Boards to be provided with a loan of Rs. 5,000 for the purchase of fodder wherever available. The Taluk Boards should sell the fodder. Railway concessions should be provided for the transport of fodder.

Questioned by Mr. Yegnanarayana Aiyar. Mr. Davison stated that after two months no grass would be available in Lukkuvally forest. Mr. Yegnanarayana Aiyar emphasized that this grass should be cut immediately and stacked.

Mr. H. Srinivasa Rao reminded the probabilities of damage to the stacks of hay from forest fires and thought that transport of fodder from forests was impracticable. But grass might be cut, made into hay and stacked in forests and people may go to the forests and purchase hay.

There was then some discussion on the question whether sufficient labour would be available for the cutting and transport of hay.

Mr. Ramakrishnaiya of Bangalore suggested that Government might get the hay cut and transported through contractors. Mr. Yegnanarayana Aiyar did not think that there would be any trouble for want of labour. There was a big slump for labour and hundreds would be available for cutting grass.

Mr. S. D. Achar informed that Honnali people were bringing hay from Shikarpur, and thought that labour would be available.

Mr. Chikkegowda of Shravandahalli thought that the transport of cattle to the Malnad by whatever agency was impossible.

Messrs. Yegnanarayana Aiyar and D. G. Ramachandra Rao insisted that not a moment should be lost as regards cutting grass in Lukkuvally and other places and stacking it, the question of transport being considered later.

Mr. A. K. Yegnanarayana Aiyar then formally moved the following resolution :—

" That as it is very likely that acute distress consequent on fodder scarcity will arise in certain parts of the State and as the existence of large areas of grass in the Malnad forests and other Government waste lands has been brought to the notice of this meeting and further as this grass will very soon become unsuitable for fodder, or incurs the risk of destruction by fire, this meeting recommends that immediate arrangements

be made for the cutting and stacking of this grass. The question of utilizing the fodder on the spot or by transport to the areas of distress may be considered and settled within a period of two months from now."

Messrs. C. Ramachandra Vasudeva Rao, M. S. Lingegowda, D. G. Ramachandra Rao and W. Davison supported. The resolution was put to the vote and carried, none opposing.

The following resolution moved by Mr. Davison and supported by Mr. N. Rama Rao was carried, none opposing :—

" That in view of the fact that large areas of land suitable for grazing of cattle exist in the Malnad tracts, facilities be given to all inhabitants of the distressed areas to move their cattle to these areas and that assistance be given by establishing marching camps where fodder may be supplied at cost, should the situation demand it."

Mr. Yegnanarayana Aiyar moved and Mr. S. Venkatasami Gowda seconded the following resolution :—

"That as the stock of fodder made available in the above said manner is not likely to meet adequately the need of the present situation, it is necessary to utilize all local resources in the shape of emergency fodder like prickly pear ; that for this purpose cattle camps be organized at places with water facilities like the banks of the Pinakini and other rivers under the control of the Agricultural Department.

The resolution was carried, none opposing.

The meeting then closed for the day.

Friday, the 14th December, 1923.—*Second Day.*

The meeting commenced at 12 noon, with Dr. Leslie C. Coleman, President, in the chair.

The following two resolutions passed by the General Body at the Annual Meeting in 1921 were read :—

(1) "That with a view to rendering assistance to ryots in well sinking a small technical agency with suitable mechanical equipment be attached to the Agricultural Department, the details of staff and equipment being left for decision to the Director of Agriculture."

(2) "That Government be moved to take steps in consultation with the P.W.D. or otherwise, to organize a labour agency for carrying out subsidiary irrigation work, such as wells, at the instance of agriculturists."

The President explained why no action had been taken on these resolutions and requested members to express their opinion. Mr. A. K. Yegnanarayana Aiyar emphasized the need of an emergency measure in

addition to a general one on the question of well sinking. Mr. Krishnappa of Chintamani pleaded for technical assistance for deepening wells in the shape of machines for boring, etc., and for financial help.

Mr. B. Srinivasa Iyengar of Anekal speaking for his part of the country thought that what was required was not so much technical help as financial help.

Mr. S. Venkatasami Gowda was sure that ryots could not themselves do well sinking properly and suggested that contractors should be employed for sinking wells under the supervision of the Public Works Department.

Mr. M. Venkata Rao reminded that the chief trouble was not the want of wells but that of lifting water from wells, etc.

Mr. M. G. Shama Rao supported the idea of organizing an agency for sinking wells.

There seemed to be no early prospect of arriving at a conclusion if the question were to be discussed in all its aspects by the General Body. A Sub-Committee was then appointed with Mr. A. K. Yegnanarayana Aiyar as Chairman to go into the question and to submit definite proposals to the meeting the next day.

Mr. N. Krishna Iyengar forecasting shortage of seed for fodder suggested to the Director of Agriculture the purchase and stocking of *Bili Jola* for being sold for seed to be sown in *Mungar*.

Mr. T. S. Subba Rao suggested prohibition of the export of fodder. The idea was not acceptable to the General Body.

Mr. Yegnanarayana Aiyar suggested the purchase and stacking of paddy straw from Mysore District.

Mr. K. Krishnamurti suggested that the Irrigation Department be moved to give water from January to fodder crops. Mr. T. S. Subba Rao thought that the suppiy could perhaps not be guaranteed due to want of sufficient supply. It was agreed that a suggestion be made to Government that water be supplied for fodder cultivation in channel areas. The Director of Agriculture was requested to address the Revenue Commissioner requesting him to issue instructions restricting tank beds for the cultivation of fodder crops only.

Dr. Kunhi Kannan then explained the virtues of the Mesquite tree of which he had brought seeds to India and distributed. Messrs. H. Srinivasa Rao and R. Gopalaswamy Iyer who have planted a few of these trees reported favourably on their growth.

Mr. S. R. Badami suggested the growing of spineless cactus as an emergency fodder. Mr. Venkata Rao Badami and others stated that the experience in the past showed that the spineless cactus

was not hardy and had not shown signs of thriving here. In spite of this assurance the meeting did not seem to be in favour of welcoming uncertain guests but seemed to be glad at the prospect of getting rid of the spiny variety.

Mr. D. B. Sivarama Rao then explained how prickly pear was being prepared for use as fodder and promised to exhibit the pincers, etc., employed for pulling out the spines.

Mr. W. Davison pointed out that prickly pear was not to be used by itself but should be supplemented with dry fodder. Old cattle do not thrive on it. He drew attention to the fact that cattle fed on it could do without water for a long time and read the following extract from a newspaper :—

"Interesting experiments of great importance to areas liable to severe drought were carried out recently by the Grootfontein School of Agriculture in South Africa to ascertain whether stock could be kept alive for lengthy periods on a ration of prickly pear leaves alone.

It was demonstrated that sheep, though they fell off in condition, could exist for 280 days solely on a diet of prickly pear, and when a small allowance of lucerne was fed in addition, after that period the sheep were able to go for 500 days without a drop of water depending on the moisture from the prickly pear."

The President pointed out that people must take up prickly pear feeding immediately as a small quantity of fodder was available and as the stuff could not be used alone without detriment without being supplemented with other fodder.

The meeting then adjourned for lunch.

Discussions on **Sericultural subjects** was taken up after lunch at 3-30 P.M.

Mr. N. Rama Rao, Superintendent of Sericulture, speaking generally, described how badly silk was reeled in Mysore and what good reeling was being done at the Mysore Filature. It cost Rs. 18 to produce a pound of well-reeled silk and a rupee extra for sending it to France. A pound of silk sold at Rs. 21 a pound giving on an average a profit per pound of Rs. 3½ to 4. With a bigger filature bigger profits could be obtained. Speaking on the supply of seed Mr. Rama Rao stated that some 70 lbs. of cocoons were sold last year but the demand could hardly be met. He then spoke on the work of aided grainages and wanted members to help the Department in supplying seed by rearing worms. Speaking on the diseases of the silkworm Mr. Rama Rao stated that there was greater loss by flacherie than from pebrin. This was due to bad rearing. Speaking on Sericultural Co-operation the Superintendent

described sericulture as a poor man's industry and as such required co-operation. There were six thousand Sericultural Co-operative Societies in Japan. He thought co-ordination of the work of various departments could do much but the people themselves must help and come forward. He then explained why agricultural societies could not help sericulture. Sericulturists were poor and illiterate people who do not come forward. We must give them material and find sale for their produce also. Cash loan is not all that was wanted.

Mr. Abdul Rashid Sahib of Channapatna speaking on various matters emphasized that filatures must be established in many places. The Mysore Filature alone would not do. He would not be satisfied with reeling alone : he would like the silk being spun into cloth here alone. He also pleaded for Mohammedan Sericultural Inspectors.

Mr. K. H. Ramayya. Registrar of Co-operative Societies, referring to the co-ordination of the work of departments alluded to by Mr. Rama Rao, said that he would be quite willing to co-operate with the Superintendent of Sericulture in establishing sericultural co-operative societies in the same way as he had co-operated with the Agricultural Department as regards agricultural societies.

Mr. H. S. Govinda Rao, B.A., who recently returned from Japan after special study, then spoke on the results of hybridization work ; a summary of his speech has been published.

Mr. Kulkarni speaking next from his experience stated that sericulture was profitable only when the owner himself does the rearings and gave figures to prove his point. Financial help was the one needed for the industry and co-operative societies for the purpose should immediately be started.

A mohammedan gentleman from Mulbagal explained how he with many others in his locality had changed from sugarcane to mulberry cultivation. He had 5 acres under mulberry and got 5 or 6 crops per year. He was getting a profit of Rs. 150 over and above what he used to get from cane.

Messrs. B. Narasinga Rao and N. Krishna Iyengar gave the results of their experiments. The latter had reared 10 trays and got an excellent crop. He had given the cocoons to the Department.

The Mysore Plough.—Discussion on the result of experiment with the Mysore plough was then taken up. Due to the bad season there were not many reports about the Mysore plough, *i.e.*, the plough manufactured by Messrs. Ransomes of England on the model of the Hebbal lough which was tried by our members in previous years and reported on.

Mr. Mac Isaac wished that only excellent metal should be used for the plough. Prof. Venkatanaranappa complained that the Mysore plough was weightier than the Kolar Mission plough and bullocks had to strain a lot due to the weight.

Mr. M. Venkata Rao of Kadur District wanted a two-furrow plough for the Malnad.

For want of time reports on the trial of varieties of ragi, ground-nut, etc., were decided to be published in the *Journal*.

Mr. S. Krishna Rao brought to the attention of the meeting that seed tests of H.M. 544 sugarcane taken from Mr. Mac Isaac's estate had split and began to grow like grass. He exhibited specimens he had brought from Tumkur.

Messrs. N. Krishna Iyengar and M. S. Lingegowda thought that that may have been due to bad seed.

Dr. Coleman suspected that it was a disease.

Mr. T. Narasinga Rao then read his report on his experiment on spraying for Koleroga of coffee. The report is printed elsewhere. The President thanked Mr. Narasinga Rao for the excellent work he had done and requested him to continue his experiment next year on a larger scale and give his results to the meeting next year.

Saturday, the 15th December, 1923.—*Third Day.*

In the morning members visited the laboratories, the Insectary and the Pot-Culture House of the Department of Agriculture.

The meeting commenced at 2-10 P.M., at the Daly Hall with Dr. Coleman in the chair.

The Colonization Scheme.—The discussion on the "Colonization Scheme" was started by Mr. Gundappa S. Kurupad. He said that the scheme that was going to be discussed was not a new one. It had been considered in the departmental conference, five years ago. A Committee was appointed to draw up a scheme and the results of the deliberations of the Committee, were published in the first issue of the Union *Journal*. The main idea with which the scheme was started, was to provide a suitable occupation for such of those who pass out of the agricultural schools, and do not succeed in obtaining employment. Government is doing a good deal to help the agriculture of the State, and it is the object of this scheme to show a way in which an entirely new and efficient class of farmers may be helped to come into being. The scheme as finally approved is printed elsewhere.

A few points about this scheme may be touched upon. The colonists will be men personally known to the Director of Agriculture on whose

recommendation alone could any one benefit under this scheme. It will be seen that the advance from Government is given not all at once but in lumps of one thousand rupees. Until the Director is satisfied that one istalment is properly spent, the next instalment is not available. Thus, at no time will a colonist have an uncovered debt of more than a thousand rupees and in the unlikely event of something happening to prevent the realization of this money the security of a thousand and five hundred rupees will cover this amount. The land has all to be brought under cultivation in three years, so that after this period the land will have acquired a marketable value. Further, the land does not become the property of the owner till 25 years are over. Thus Government runs very little risk of losing any money invested in this scheme, which, if successfully carried out, is bound to have a very beneficial effect on the general agriculture of the State.

It is proposed that these farms should be grouped together—about 12 of them in one place—to form a colony. The idea of this is to enable the colonists to provide themselves with community conveniences such as school, recreation grounds, post office, dispensary, veterinary hospital, library, reading room and such like at a moderate cost. Again all the benefits that can be derived from co-operative organization of all kinds can be had to the fullest extent as all the colonists will be quite alive to the advantages of co-operation. Further, since the colonists can have society of their own standard, they are more readily attracted by a scheme of this kind, than if the farms were scattered about as single units. This is an important consideration when we remember that attraction in the shape of proper society and atmosphere must be afforded if students have to be weaned away from city life. City conveniences also must be provided as far as possible, and this would be done at a reasonable cost only by co-operative effort.

This scheme might sound very novel to us, but just at the time we were talking about it here, a scheme very similar to this was started in California in 1918. There the State had to purchase the land for the purpose and sell them to the colonists. This item of expenditure is absent here and thus the inauguration of the scheme is made quite easy. He then put forward his proposition as follows :—

" This meeting approves of the Colonization Scheme as amended and requests the Director of Agriculture to take necessary action with a view to bringing the scheme into operation as early as possible."

Mr. M. S. Lingegowda seconded.

Dr. Kunhi Kannan said that he was afraid there was nothing to prevent the individual farms being divided up according to the Hindu

Law, once they became the property of the colonists. If that happened, the idea with which the colony was started, would be frustrated. He also said that he was against the scheme as it stood, and would prefer the farms to be scattered all over the State instead of being grouped into colonies.

Mr. T. Narasinga Rao said he was of the same opinion as Dr. Kunhi Kannan.

Mr. N. Rama Rao said that the clause "The rights vesting under this scheme shall not be partible under the Hindu Laws of Inheritance, but shall devolve intact to the entire family" might be added. This was accepted by Mr. Gundappa S. Kurpad. Mr. Rama Rao further said that the clause saying that no loan would be given after the expiry of three years, might be modified by the addition of the following :—"Unless it be for the purpose of paying off of debts incurred in permanent improvements". This was also accepted.

Mr. V. K. Badami put in an impassioned plea against scattering the farms and said that in view of the desirability of providing the young men with society of their own standard and most of the city conveniences it would be fatal to the success of the scheme if the farms are scattered as single units.

Mr. A. K. Yegnanarayana Aiyar next spoke about the scheme and explained how every point had been discussed in the Committee and how necessary it was that such a scheme should come into being.

Dr. Coleman pointed out that if Dr. Kunhi Kannan wanted to press his point, he should oppose the resolution before the meeting, and duly bring in a fresh proposition himself. After some more discussion the resolution was put to the meeting and carried unanimously.

Sinking Wells.—The report of the Sub-Committee appointed to go into the question of sinking wells, was then read and explained by the Chairman of the Sub-Committee, Mr. A. K. Yegnanarayana Aiyar. Mr. H. Srinivasa Rao proposed and Mr. M. S. Lingegowda seconded the following resolution :—

Resolution.—" That a system of special takkavi loans be instituted under somewhat the following lines :—

Loans for the purpose of sinking or improvement of wells be granted up to a maximum of Rs. 200 in each case on the security of the immoveable property of the applicant ; that the loans be repayable in ten annual instalments ; that no interest be charged for the first two years and that thereafter, the usual rate for takkavi loans be charged ; that the concession regarding exemption of interest be forfeited in case the loan is not used for the purpose of well sinking ; that as the measure is specially

intended to meet an emergent situation the procedure *re* grant of the loan should be such as to ensure the utmost promptness in the sanction of the loan and its payment to the applicants.

2. That as regards wells to be sunk on Government lands or *kattes* or other water sources for the common use of the villagers, the following concessions be granted :—

In the case of works already started, a grant be paid to the villagers equal to three times the amount already spent, or just as much as may be required to complete the work, whichever may be less.

3. That in the case of works to be started and constructed by the villagers, Government pay three-fourths of the cost thereof on completion of the work. In the case of the depressed classes, their part of the village be considered as an independent unit and that Government bear the full cost of the well or other work intended for their use. That grants in regard to the abovementioned cases be subject to a maximum of Rs. 100 for each work.

That in order to facilitate payment—

(*a*) A schedule of rates for different classes of work, according to the local conditions, be furnished to the Taluk Board.

(*b*) Measurements be made promptly, members of Taluk Boards or other suitable persons, if necessary, be requested to assist.

(*c*) An imprest be given to the Taluk Boards for this expenditure to operate upon and recoup as required."

The resolution was then put to the meeting and carried unanimously. Mr. M. Srinivasiengar of Masti moved and Mr. H. Srinivasa Rao seconded the following resolution :—

Resolution.—" That in order to afford technical assistance in the deepening of existing wells and of constructing of new wells a suitable agency, being the starting point of a well-boring and pumping department, be created and the necessary equipment which should include at least two power drills be provided. That in order to make a fuller use, of wells with a good water supply, eight portable pumping outfits be provided, and that this agency be intended for work for a number of years and that it be placed under the control of the Director of Agriculture."

The resolution was put to the meeting and carried unanimously.

The Union Home.—The subject of the Union Home was then taken up. The Secretary briefly explained the scheme with plan and estimates prepared by the Agricultural Engineer. There was some discussion as regards the nature of the accommodation to be provided and the ways

and means of getting together funds. Mr. N. Rama Rao's suggestion of raising money solely through debentures did not find favour. Mr. Rama Rao thereupon moved the following resolution :—

"Resolved that a Union Home is necessary.

"That the buildings of the Home should be so designed as in the first instance to admit of their use as living accommodation, such structures as a hall, etc., being considered when funds admit ot their being undertaken.

"That an estimate of cost be prepared for a complete scheme, and that the funds necessary be raised on debentures of suitable denomination, bearing a reasonable interest ; collections may be made by subscriptions and donations also.

"That the sale of debentures be confined in the first instance to members of the Union, who shall also have preference in regard to the use of the buildings when they are not required for a sitting of the Union.

"That Government be moved to contribute a half of the funds, raised by debentures and subscriptions as above proposed."

The resolution after being seconded was put to the meeting and carried, 20 members voting for and none against. The majority present abstained from voting.

The matter was referred back to the Managing Committee for re consideration in the light of the resolution passed.

Elections.—The following Managing Committee was then elected to conduct the Union during the coming year :—

PRESIDENT :

Dr. Leslie C. Coleman, M.A., Ph.D.

VICE-PRESIDENT :

H. Srinivasa Rao, Esq.

MEMBERS :

1. Mr. N. Krishna Iyengar, B.A.
2. ,, A. K. Yegnanarayana Aiyar, M.A., N.D.D., etc.
3. ,, B. Venkatanaranappa, M.A.
4. ,, R. Gopalaswamy Iyer.
5. Dr. K. Kunhi Kannan, M.A., Ph.D.
6. ,, B. Narasimha Iyengar, B.A., Ph.D.
7. Mr. M. S. Lingegowda.
8. ,, S. Hampayya.
9. ,, W. Davison, B.S.A.
10. ,, T. Narasinga Rao.

11. Mr. N. Rama Rao, B.A., B.L.
12. ,, T. S. Subba Rao.

Mr. M. S. Lingegowda was unanimously elected representative of the Union on the Board of Agriculture.

The President in bringing the meeting to a close regretted that sufficient time could not be devoted to the many subjects on the programme as a good part of it had to be devoted to the discussion of the fodder situation which required immediate handling. He thanked the members for the practical proposals they had given him and promised to go up to Government immediately with recommendations on the lines of their proposal.

Mr. S. Hampayya moved a hearty vote of thanks to the President. It was carried with acclamation.

On being proposed by Mr. N. Rama Rao a vote of thanks was accorded to Father Tabard for kindly placing the Daly Hall at the disposal of the Union for the Annual Meeting.

Three cheers to H. H. the Maharaja were called and the Meeting closed.

[N. V. S.]

ANNOUNCEMENT.

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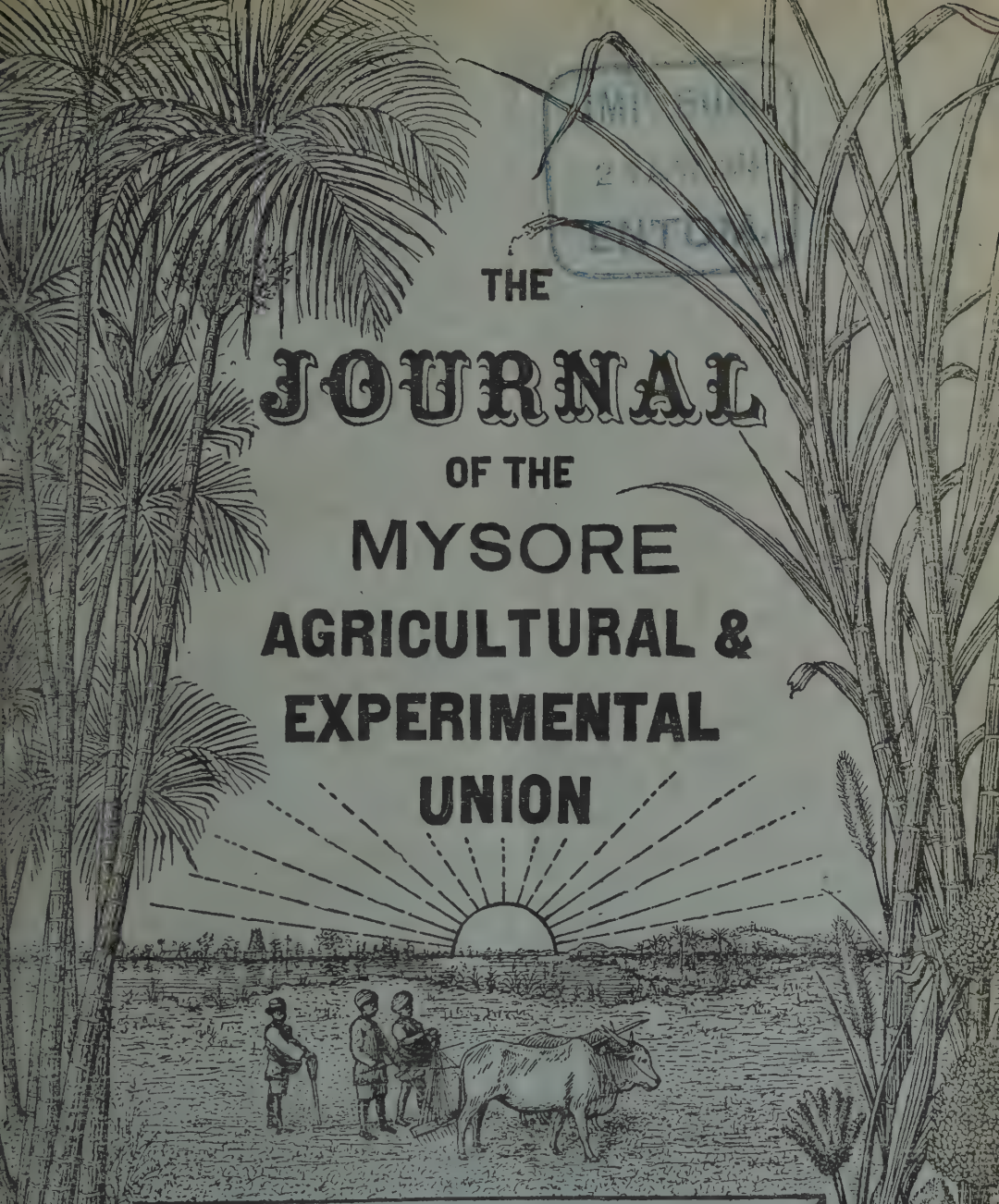

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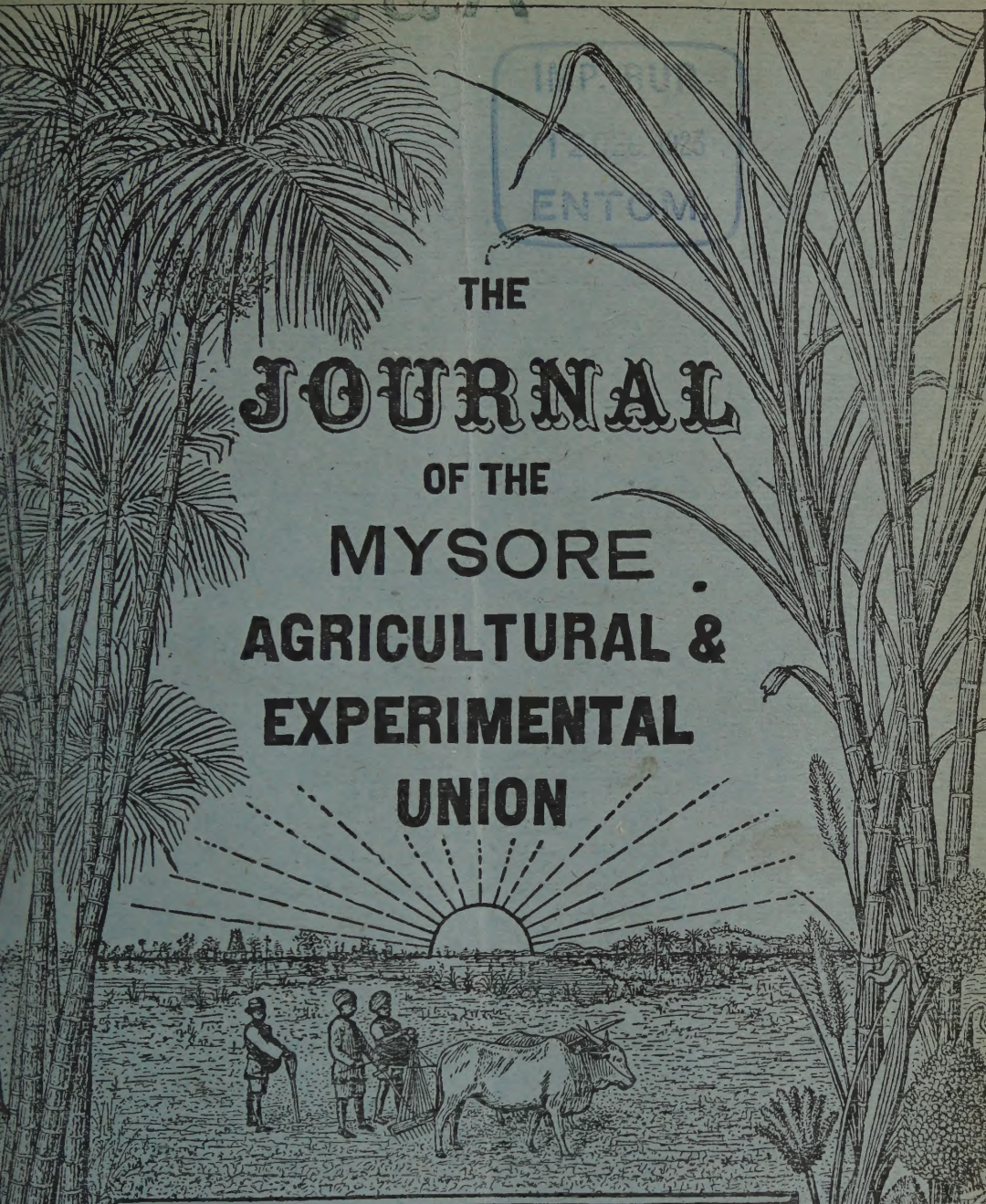

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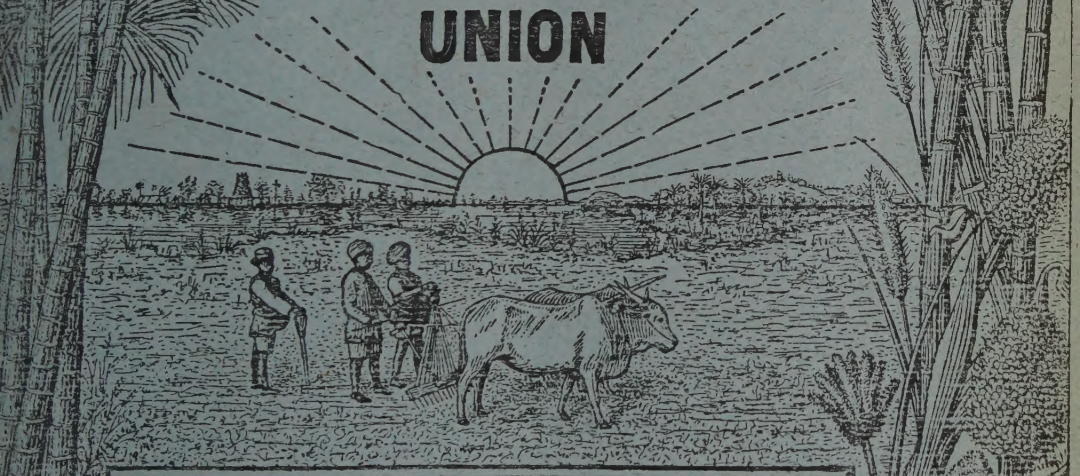

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